

A Circular of
Practical Information for
Inventors, Merchants,
Manufacturers,
Mechanics

THE INVENTOR'S MANUAL

by
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THE INVENTOR'S MANUAL.

A CIRCULAR OF PRACTICAL INFORMATION

FOR

Inventors, Manufacturers, Merchants, and Mechanics.

BY

ERNEST C. WEBB,

SOLICITOR OF AMERICAN AND FOREIGN PATENTS,

AND

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OFFICES, No. 22 CLIFF STREET,

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INTRODUCTORY.

It has been aptly said that "necessity is the mother of invention." Assuming this to be true, the system of Patent Laws, by which the product of invention is protected, and its exclusive use guaranteed for a specified time to the original discoverer, may well be considered in the light of a guardian to the otherwise helpless offspring of necessity.

For centuries the inventor was compelled to work in secrecy and seclusion. Every new machine, every new process in manufacture, met with the strongest opposition, alike from the master workmen and their journeymen and apprentices, and in many cases from the Government of the country, in which the new invention first saw the light. The first class, the employers, opposed it, from the fear that its introduction might lessen their profits; the second, the workmen, from a belief that its application might result in a reduction of wages and a corresponding diminution in the number of hands employed; and the Government officials threw every obstacle in the way, lest the successful working of the new process should diminish the receipts from the taxation imposed upon manufacturers, or for the reason that dangerous dissensions might be created, and thus, the stability of the State be endangered. There existed also, the feeling against what are termed "Monopolies," of which we have had so many illustrations in recent times, and these causes working together, engendered their natural results, and made it a matter of the utmost difficulty for any inventor to reap the proper reward for the outcome of his skill and labor. Happily, we live in better times. All civilized nations now seek to encourage and protect the inventor of any new and useful machine or process, and he may, at moderate cost, so secure himself against all others, that he is almost certain to receive ample compensation.

Among no other people has the inventive genius been so widely manifested as among the citizens of the United States, and it is, therefore, peculiarly fitting that our Patent Laws should be, as they are, based on broad and liberal principles, securing to the inventor absolute protection against those who would surreptitiously avail themselves of the fruits of his original conceptions, wrought out, perhaps, by long and weary toil and research, while at the same time the cost of such an invaluable safeguard is placed within the means of all. It has ever been the policy of our Government to encourage invention, and the result of this policy may be seen in the long array of grand discoveries in art, science and mechanics, which have conferred honor upon the American name.

It is probable that no field of human labor offers such certain and adequate reward as that of the invention of new and useful machines, processes, or methods of manufacture. The list of American inventors, who have won fame and fortune from the successful working of patented inventions, would fill pages. The names of McCormack, Howe, Morse, Colt, Goodyear, Winans, Whitney, Hotchkiss, Edison, and many others, will at once occur to the reader, and they are but types of a large class. It is not always, however, inventions of apparently

the first importance which prove the most profitable. The merest trifles sometimes produce almost fabulous sums, and it is in such cases that the protection afforded by a patent is the most quickly felt.

While the method of obtaining a patent under the United States Patent Laws is extremely simple, the services of a skilled attorney will in nearly every case be found of incalculable advantage. In many instances the inventor will be saved much useless labor and research by confiding his interests to some reputable solicitor, and the ultimate procurement of the patent sought greatly expedited.

It is not the purpose of the author to give in this little volume an elaborate treatise on Patent Law, but rather to place before the reader a plain and concise statement of the means necessary to obtain Patents, Trade-marks, Copyrights, etc., either in the United States or in any foreign country, together with a variety of general information of universal value.

NEW YORK, February, 1882,

ERNEST C. WEBB.

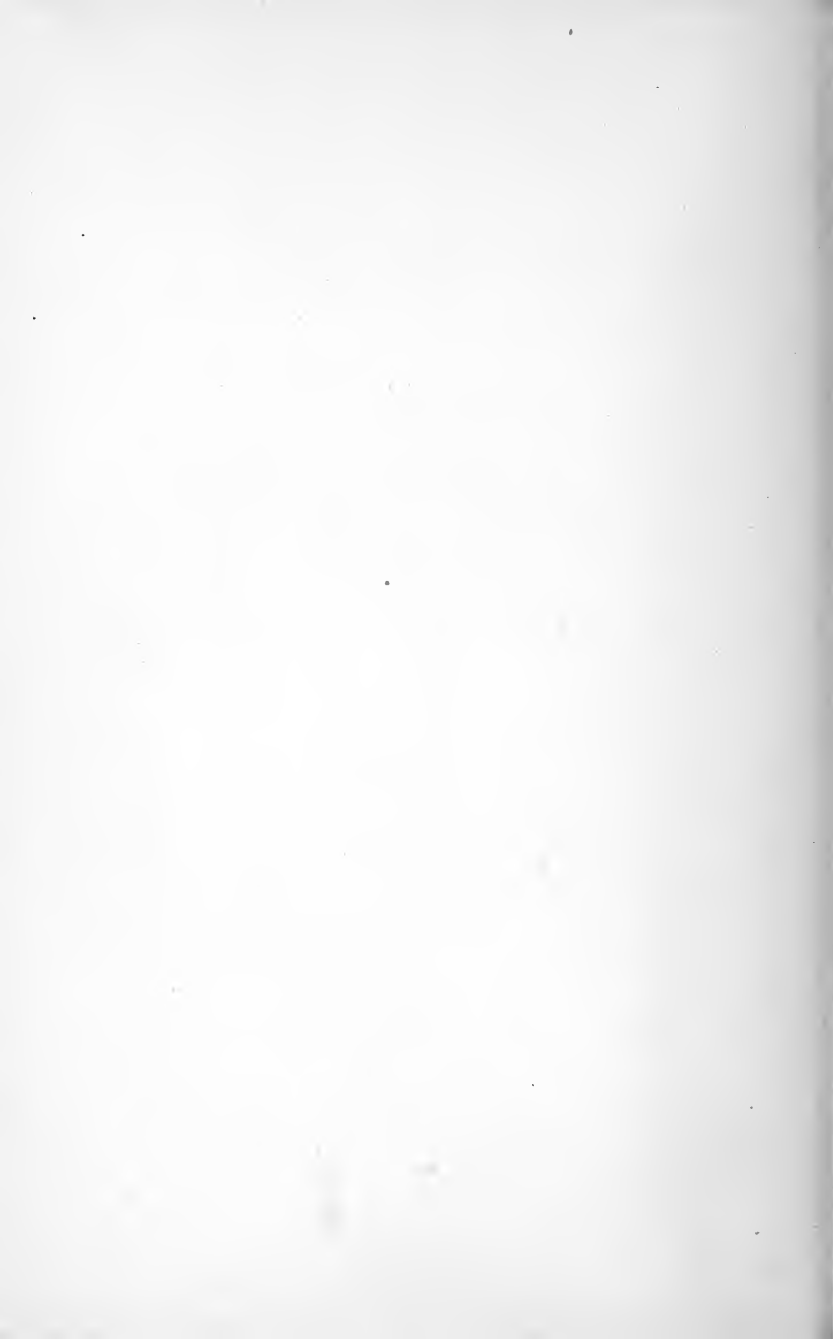
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PART I.

AMERICAN PATENTS.



THE INVENTOR'S MANUAL.

THE POLICY OF PATENT LAWS.

THE true policy of patent laws is to awaken and stimulate the spirit of invention, by holding forth to the inventive mind an inducement to work. If an inventor could receive no benefit from the creation of his brain, fewer inventions would be made. Take away the opportunity to make money by the production of something new and useful, and you take away the incentive to invent—and it therefore follows, as a logical sequence, that the intellectual products of the inventor must be fostered and protected. Our excellent patent system has been a very potent factor in developing our manufacturing interests and the resources of the country, and it has been well said "If Europe does not amend its patent laws, America will speedily become the nursery of useful inventions for the world."

WHAT IS A PATENT.

A patent is in the nature of a contract between the inventor and the Government, to the effect, that if the inventor shall disclose his invention to the public by filing a description of the same in such full, clear and exact terms, that any person skilled in the art or science to which it appertains may be able to make and use the invention so described, then the inventor or his assigns, or legal representatives shall have the exclusive right to make, use and vend the invention for the term of 17 years; and that at the expiration of this term, the right to make, use and vend the patented invention shall become common property. It will thus be seen that the true consideration for the grant of a patent is the disclosure by the inventor, of his invention or discovery, so that the same may at a certain time enure to the benefit of the whole people.

WHO MAY OBTAIN A PATENT.

Any person who has invented or discovered any new or useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof, may, upon application in regular form, and upon the payment of the fees required by law, obtain a patent.

WHAT IS PATENTABLE.

Anything that is new and useful, or any new and useful improvement on existing devices which has not been known or used by others in this country, and not patented or described in any publication in this or any foreign country before the invention or discovery.

THE APPLICATION.

Preliminary to the application for Letters Patent it is sometimes advisable to make what is usually called a "Preliminary Examination." The object of this is to ascertain if the invention forming the basis of the application has been previously patented in this country, by making a careful search through the records of the Patent Office, relating to the subject matter of the invention.

After the preliminary questions of determining the patentability of the invention have been disposed of, the next step is to prepare the application papers consisting of the specification or description of the invention, the petition praying for the grant of the patent, the oath of invention, and a complete drawing (when admissible) of the device.

Great skill and care must be exercised in preparing the specification and claims, as a carelessly drawn specification and claims, not comprehending the full scope of the invention, will invariably subject the inventor, or subsequent owner of the patent, to the necessity of reissuing the patent, *and oftentimes to great pecuniary loss.* (See division on Reissue patents.) Hence it is absolutely imperative for the inventor to select a careful and experienced attorney to prepare the papers upon which his patent will be founded.

In order to properly prepare the specification and drawings we require a brief, accurate description of the invention, and a sketch illustrating it, when admissible. Under the new rules of the Patent Office, models of inventions are not received except when specifically called for by the Examiner in charge of the case, but it is always better for an inventor to make a model, even if it is only a rough one, as it is in most cases of considerable assistance in preparing the application papers. Models furnished to us for our inspection during preparation of the application and prosecution of the case, will be returned when called for.

CAVEATS.

The object of a caveat is to protect inventors while they are experimenting to perfect or demonstrate the practicability and utility of the invention. It consists of a brief description or specification of the invention, and a drawing illustrating the same (when possible). These are filed in the confidential archives of the Patent Office and preserved in secrecy, and if application is made within one year from the date they are filed by any other person for a patent conflicting with the invention disclosed by the caveator, notice is immediately sent to the

caveator, and he is required to file a complete application for a patent within three months. Caveats can only be filed by citizens of the United States, or aliens who have resided in the United States for one year and have declared their intention to become citizens.

REISSUE PATENTS.

[*Extract from Sec. 4916, Rev. Stat.*]

Whenever any patent is inoperative or invalid, by reason of a defective or insufficient specification, or by reason of the patentee claiming as his own invention or discovery more than he had a right to claim as new, if the error has arisen by inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, the Commissioner shall, on the surrender of such patent and the payment of the duty required by law, cause a new patent for the same invention, and in accordance with the corrected specification, to be issued to the patentee, or, in the case of his death or of an assignment of the whole or any undivided part of the original patent, then to his executors, administrators, or assigns, for the unexpired part of the term of the original patent.

In a majority of cases the necessity of reissuing a patent is due to the carelessness or inefficiency of the attorney who prepared the original application papers. Very often the discovery that a patent is inoperative is not made until the manufacturer of the patented article applies to counsel to institute proceedings against infringers, and it may be then too late to reissue the defective original patent, and obtain a new patent, upon correct specifications and drawings, which will stand the test of litigation. Reissues cost the applicant from \$60 to \$100, according to the labor involved, and no damages can be collected for infringements committed prior to the date of the Reissued Patent. Since 1871, over seven thousand patents have been surrendered and Reissued Patents obtained therefor.

We make a SPECIALTY of reissuing defective patents, and will examine patents when requested, and give opinions as to the correctness of the specifications and drawings.

DESIGN PATENTS.

A design patent is granted to any person who has invented and produced any new and original design for a manufacture, bust, statue, alto-relievo or bas-relief; any new and original design for the printing of woolen, silk, cotton or other fabrics; any new and original impression, ornament, pattern, print or picture to be printed, painted, cast, or otherwise placed on or worked into any article of manufacture, or any new, useful and original shape or configuration of any article of manufacture. Design Patents are granted for periods of $3\frac{1}{2}$ years, seven years, and fourteen years, as may be specified in the application. Manufacturers and dealers in clocks, silverware, jewelry, carpets, glassware, &c., will find it largely to their advantage to thus protect their new patterns.

REJECTED AND ABANDONED APPLICATIONS.

Applications for Letters Patent are very often rejected by the Examiners through a misunderstanding of the invention, or from failure of the attorney in charge of the case to properly prosecute it and point out the differences existing between the invention and the references cited as anticipating it. We attend to such cases, and when our services are required, we will, upon request, furnish a power of attorney authorizing us to proceed in the matter.

Applications for patents which have been allowed are sometimes abandoned by the failure of the inventor or his attorney to pay the final Government fee within the required time. Cases of this character may be revived, and a patent for the invention secured.

TRADE-MARKS.

Any person, firm or corporation domiciled in the United States, or located in any foreign country, which by treaty, convention or law affords similar privileges to citizens of the United States, and who is entitled to the exclusive use of any trade-mark, and uses the same in commerce with foreign nations or with Indian tribes, may obtain registration of the same in the United States Patent Office.

Owners of trade-marks for which PROTECTION HAS BEEN SOUGHT BY REGISTERING THEM IN THE PATENT OFFICE UNDER THE ACT OF JULY 8, 1870 (declared unconstitutional by the Supreme Court of the United States), may register the same for the same goods, WITHOUT FEE, on compliance with the Statutory requirements of the Act of March 3, 1881.

Registration of a trade-mark is *prima facie* evidence of ownership. Any person who shall *reproduce, counterfeit, copy, or colorably imitate any trade-mark so registered* and affix the same to merchandise of substantially the same descriptive properties as those described in the registration, *shall be liable to an action on the case for damages* for the wrongful use of said trade-mark at the suit of the owner thereof; and the party aggrieved shall also have his remedy according to the Course of Equity to *enjoin the wrongful use of such trade-mark* used in foreign commerce, or commerce with Indian tribes, as aforesaid, and to *recover compensation therefor* in any Court having jurisdiction over the *person guilty of such wrongful act*; and Courts of the United States have original and appellate jurisdiction in such cases without regard to the amount in controversy.

PRINTS AND LABELS.

By the Act of June 18, 1874, it is provided, that prints and labels, such as are usually used by manufacturers to denote the name of the manufacturer,

place of manufacture, style, or quality of goods, directions for use, &c., may be registered in the Patent Office, and that the certificate of such registration shall continue in force for 28 years.

APPEALS.

Every application for a patent, or a reissue of a patent, which has been twice rejected upon the same references by the Examiner in charge, is considered as being finally rejected, and in condition for appeal. Three appeals may be taken in such cases from adverse decisions, viz.: First, to the Board of Examiners in Chief; second, to the Commissioner of Patents, who is the chief executive and judicial officer of the Patent Office; and third, to the Supreme Court of the District of Columbia. In case of an adverse decision of each of these three tribunals, proceedings may be instituted in the United States Courts, to adjudicate the rights of the applicant in the premises. Our fees for prosecuting appeals are governed by the amount of labor involved, and are subject to special agreement.

INTERFERENCES.

An interference is a proceeding instituted for the purpose of determining the question of priority of invention between two or more parties, claiming substantially the same patentable invention. This proceeding is in the nature of a trial, both parties being obliged to file statements under oath, called preliminary statements, disclosing the date of his original conception of the invention; of its illustration by drawing or model; of its disclosure to others, and of its completion and of the extent of its use. These statements must be prepared with great care, and competent counsel should be retained, as the parties to the interference will be strictly held to the dates disclosed by their preliminary statements.

After these statements have been filed in the Patent Office, the Examiner of Interferences fixes the dates within which each party must take and close his oral proofs. The case is then, upon the conclusion of the testimony on both sides, duly argued before the Examiner of Interferences or submitted for his decision. Either party may appeal from an adverse decision to the Board of Examiners in Chief, and thereafter to the Commissioner of Patents, but no appeal can be taken in interference cases from the decision of the Commissioner of Patents. It will be seen that from the nature of these proceedings, that competent and experienced attorneys are required to properly conduct such controversies.

Our fees in these cases are necessarily the subject of special agreement corresponding to the amount of labor involved in each individual case.

EXTENSIONS OF PATENTS.

Patents can only be extended by Special Act of Congress. Our services may be secured to procure or oppose extensions.

OPINIONS.

We make SPECIAL EXAMINATIONS to determine the novelty of any invention either before or after a patent has been obtained, and furnish a written opinion relating thereto. We also examine into the title of any patent, and furnish abstracts of title thereof. Our charges in these matters are moderate, and are based upon the amount of work done.

AGREEMENTS, COPIES OF PATENTS, ETC.

Assignments, agreements, co-partnership articles, licenses and other papers relating to patents prepared, and recorded when necessary. Copies of patents and other official papers procured. Our charges in these matters are moderate, and depend upon the time given to each case.

INFRINGEMENT SUITS.

Suits for infringement of patents are brought in Federal Courts, and are in the nature of an application to the Court for an injunction to restrain the continued unlawful use of the patented invention, and for damages for such use. Infringements of trade-marks may also be stopped by injunction in the same way.

Our services can be secured to prosecute or defend suits relating to patents and trade-marks, at reasonable rates.

COPYRIGHTS.

Any citizen of the U. S., or resident therein, who shall be the author, inventor, designer, or proprietor of any book, map, chart, dramatic or musical composition, engraving, cut, print, or photograph or negative thereof, or of a painting, drawing, chromo, statue, statuary, and of models or designs intended to be perfected as works of the fine arts, shall, upon obtaining a copyright therefor, have the sole liberty of printing, reprinting, publishing, completing, copying, executing, finishing and vending the same, and in the case of a dramatic composition, of publicly performing or representing it, or causing it to be performed or represented by others. And authors may reserve the right to dramatize or to translate their own works.

Every applicant for a copyright must state distinctly the name and residence of the claimant, and whether right is claimed as author, designer, or proprietor. No affidavit or formal application is required.

A printed copy of the title of the book, map, chart, dramatic or musical composition, engraving, cut, print, or photograph, or a description of the paint-

ing, drawing, chromo, statue, statuary, or model or design for a work of the fine arts, for which copyright is desired, must be sent by mail or otherwise, prepaid, addressed "LIBRARIAN OF CONGRESS, WASHINGTON, D. C." This must be done before publication of the book or other article.

Within ten days after publication of each book or other article, two complete copies must be sent, prepaid, to perfect the copyright, with the address, "LIBRARIAN OF CONGRESS, WASHINGTON, D. C."

Without the deposit of copies above required the copyright is void, and a penalty of \$25 is incurred.

No copyright is valid unless notice is given by inserting in every copy published,

"Entered according to Act of Congress, in the year —, by —, in the office of the Librarian of Congress, at Washington," or at the option of the person entering the copyright, the words: *"Copyright, 18—, by —"*

The law imposes a penalty of \$100 upon any person who has not obtained copyright, who shall insert the notice *"Entered according to Act of Congress,"* or *"Copyright,"* or words of the same import, in or upon any book or other article.

Each copyright secures the exclusive right for twenty-eight years. Six months before the end of that time, the author or designer, or his widow or children, may secure a renewal for the further term of fourteen years, making forty two years in all.

Any copyright is assignable in law, but such assignment must be recorded in the office of the Librarian of Congress within sixty days from its date.

Copyrights cannot be granted upon trade-marks, nor upon labels intended to be used with any article of manufacture. If protection for such prints or labels is desired, application must be made to the Patent Office, where they can be registered.

Copyrights may be secured through this office for a moderate fee in excess of the regular Government charges.

SCHEDULE OF FEES

FOR OBTAINING U. S. PATENTS, ENTERING COPYRIGHTS AND REGISTERING TRADE-MARKS, PRINTS AND LABELS, AND PREPARING ASSIGNMENTS, ETC., INCLUDING GOVERNMENT FEES IN EACH CASE.

Preparing and prosecuting an application for Letters Patent, for a mechanical invention in a case involving an ordinary amount of labor.	\$25 00
First Government fee	15 00
Second " "	20 00
Total	\$60 00

Of this amount, forty dollars is payable when the papers are prepared and ready to file in the Patent Office. The second Government fee of twenty dollars, may be paid at any time within *six months* of the *date of allowance* of the application.

SCHEDULE OF FEES, ETC.—*Continued.*

Preparing and prosecuting an application for Letters Patent for a design	\$15 00
Government fee for design patent, for three and one-half years	10 00
Total	<u>\$25 00</u>
Government fee for design patent, for seven years, fifteen dollars, making a total of	\$30 00
Government fee for design patent, for fourteen years, thirty dollars, making a total of	\$45 00
Preparing and prosecuting application for the reissue of a patent in any case involving an ordinary amount of labor	\$30 00
Government fee	30 00
Total	<u>\$60 00</u>
Procuring and entering a copyright	\$5 00
Government fee	1 00
Total	<u>\$6 00</u>
Preparing and prosecuting application for registration of a trade-mark	\$10 00
Government fee	25 00
Total	<u>\$35 00</u>
Preparing and prosecuting application for registration of a print or label in ordinary cases	\$6 00
Government fee	6 00
Total	<u>\$12 00</u>
Preparing and recording an assignment of a patent, trade-mark, print, label or copyright	\$5 00
Government fee usually	1 00
Total	<u>\$6 00</u>
Preparing and filing an application for a caveat, usually	\$12 00
Government fee	10 00
Total	<u>\$22 00</u>

With the exception noted, all the fees in each case are *payable in advance*, that is to say, when the papers are complete and ready to file.

Our services in preparing contracts and licenses, and in prosecuting appeals, interferences and infringement suits, are always the subject of special agreement.

PART II.

FOREIGN PATENTS.



FOREIGN PATENTS.

ARGENTINE REPUBLIC.

POPULATION 2,500,000—PRINCIPAL MANUFACTURES, PONCHOS, ROPES, SADDLE-CLOTHS, MOROCCO, LEATHER AND WOODEN WARE.

Two kinds of patents are granted, viz: Patents of Invention and Patents of Importation. The term varies from one to ten years, and the invention must be worked within one year from the date of the grant.

Very few patents are taken out, as the cost is large and the term limited to a few years.

AUSTRALIA.

POPULATION 1,800,000—PRINCIPAL MANUFACTURES, GLASS, PAPER, CLOTH, OIL-CLOTH, DYES, BEER, STARCH, SOAP, CIGARS, PIANOS, SAFES, AGRICULTURAL IMPLEMENTS, ENGINES, CARRIAGES, BRUSHES, LEATHER, WOOLEN CLOTHS, SUGAR, WINES, LIQUORS.

Each of the separate Australian Colonies of New South Wales, Victoria, Queensland, South and West Australia, New Zealand and Tasmania, have independent Patent Laws. Patents may be obtained in each Colony, and remain in force for a period of from seven to fourteen years. During the life of the patent the patentee or owner of the patent has the exclusive right to make, use and sell the invention. Special information relating to patents in these Colonies, and cost thereof, will be furnished at our office.

AUSTRIA AND HUNGARY.

POPULATION 34,904,435—PRINCIPAL MANUFACTURES, IRON, CHEMICAL PREPARATIONS, GLASSWARE, LOOKING GLASSES, HEMP AND FLAX, WOOLEN AND COTTON FABRICS, TOBACCO, JEWELRY, MUSICAL INSTRUMENTS, ETC.

Patents may be obtained by foreigners, as well as natives, and one application is sufficient for the whole Austro-Hungarian Empire.

The invention *must be worked* in Austria or Hungary within a year of the date of issue of the patent, and at some time during every two years thereafter. The term of a patent is limited to 15 years, but they are usually taken out for one year, and renewed from year to year upon payment of a small renewal tax. Foreigners are no longer required to prove possession of a corresponding patent in some other country, and patents are now renewed, upon payment of the

taxes, without requiring proof of the actual working of the invention in the Kingdom.

Patents for designs are not granted to U. S. citizens.

BELGIUM.

POPULATION 5,326,185—PRINCIPAL MANUFACTURES, LINEN, LACES, DAMASK, WOOLENS, COTTON GOODS, HOSIERY, CARPETS, MACHINERY, FIRE-ARMS, IRON, ETC.

Any person may obtain a patent, but when the applicant is not the inventor, he had better obtain the inventor's consent to the application in writing, and keep it for his own protection.

Three kinds of patents are granted, viz.: (1.) Patents of Invention; (2.) Patents of Importation; and (3.) Patents of Improvement.

A patent of invention is granted to the inventor, provided he makes application in Belgium before applying in any other country. Patents of importation are granted to any person who has previously applied for or obtained a foreign patent. Patents of improvement are granted for modifications of any invention described in a prior Belgian patent granted to the same person. No separate annuities have to be paid on patents of improvement, and they remain in force during the life of the original patent.

Patents of invention are granted for a period of twenty years; patents of importation remain in force during the life of the foreign patent; and patents of improvement during the life of the original Belgian patent. Usually, patents are secured for the term of one year, and thereafter renewed from year to year, upon payment of the annual tax.

DESIGN PATENTS.—Printed or woven designs for textile fabrics, and similar goods, may be patented in Belgium.

BRAZIL, BRITISH GULANA, BRITISH INDIA, CEYLON, GREECE AND MEXICO.

Patents for mechanical inventions may be obtained, but are very rarely applied for by American inventors. Information furnished upon application to our office.

CANADA.

POPULATION 3,906,810—PRINCIPAL MANUFACTURES, FLOUR, LUMBER, FURNITURE, HARDWARE, PAPER, CHEMICALS, SOAP, BOOTS AND SHOES, COTTON AND WOOLEN GOODS, STEAM ENGINES, AGRICULTURAL IMPLEMENTS, COARSE CLOTHS (HOMESPUN), FLANNELS, BED LINEN, BLANKETS, CARPETS AND TWEEDS, LEATHER, SADDLERY AND HARNESS, TOBACCO, MACHINERY, NAILS, GUNPOWDER, CARRIAGES, PIANOS, HATS AND CAPS, SEWING MACHINES.

Patents are only granted to the inventor or his legal assigns. The full term is fifteen years, but the patent is usually taken for five years, and thereafter renewed.

When the invention can be so illustrated, a model must be filed before the patent can be obtained. When the invention relates to a composition, samples or specimens must be furnished. The model can only be 18 inches in its greatest dimensions, and when admissible, from the nature of the case, a working model is required.

The invention *must be worked* in Canada within two years from the date of the application, and thereafter arrangements must be made to keep the invention "on sale," so that any person desiring to purchase or use it, may be able to obtain the patented article, or the products thereof.

Inventions which have been patented in the United States or other countries, cannot be patented in Canada, unless the application is filed within one year from the date of the *earliest* foreign patent for the same invention. And, if during this same period, any person in Canada shall manufacture and sell the invention previously patented in any foreign country as stated, then such manufacturer shall have the right to continue such manufacture and sale *unrestricted*, but this rule does not apply to persons who shall only commence to manufacture after the application for a Canadian patent has been filed.

CAVEATS.—Caveats may be filed to protect inventions not entirely perfected. They remain in force for one year, and the proceedings and requirements are substantially the same as in the United States.

DENMARK AND ICELAND.

POPULATION 1,912,142—PRINCIPAL MANUFACTURES, SILK, LINEN, WOOLEN AND COTTON GOODS, LEATHER, LACES, GLOVES, STRAW HATS, SAIL CLOTH, THREAD, PAPER, SOAP, GLASS, EARTHENWARE, PLATED-WARE, IRON-WARE, SALTPETRE, GUNPOWDER, ARMS, REFINED SUGAR, TOBACCO, SODA, POTASH, BRANDY AND MALT LIQUORS.

Any person may obtain a patent. The term of a patent cannot exceed twenty years and rarely exceeds *three* years.

The invention must be *worked* during each year of the life of the patent.

FRANCE.

POPULATION 36,905,788—PRINCIPAL MANUFACTURES, SILK, JEWELRY, BRONZES, SURGICAL AND PHILOSOPHICAL INSTRUMENTS, BOOKS, LACES, CABINET FURNITURE, EMBROIDERIES, IRON, CUTLERY, HARDWARE, PORCELAIN, EARTHENWARE, WATCHES, LEATHER, WOOLENS, LINENS, COTTONS, GLASSWARE, PAPER, SUGAR, TOBACCO, WINES.

Any person may obtain a patent, but when the invention has been previously patented abroad, it is advisable to make the application in the name of the "author of the invention already patented abroad," or his legal assigns.

The full term of a patent is 15 years, but they are usually taken out for *one year*, and renewed from *year to year*, by payment of an annual tax of about \$22.

The invention must be *worked* in France within two years of the date of issue of the patent, and during every two years thereafter. Patents of addition for improvements on any invention previously patented in France, may be obtained by the same person.

No patents are granted for medicinal preparations, patent medicines, or remedies of any kind.

DESIGN PATENTS.—Patents are granted for designs for new shapes or forms, and for patterns, printed, woven, or otherwise produced upon or in any material, such as iron, wood, glass, paper, leather, woven fabrics, etc.

GERMANY.

POPULATION 42,727,360—PRINCIPAL MANUFACTURES, WOOLENS, SILKS, PAPER, CABINET FURNITURE, TOYS, IRON AND STEEL, GOLD AND SILVERWARE, GLASSWARE, LEATHER, MATHEMATICAL AND ASTRONOMICAL INSTRUMENTS, CLOCKS, BEER, WINES, SUGAR.

Patents are granted to the first applicant, whether he is the inventor or not, provided the invention has *not been* published in printed form in *any country* before the date of the application. But it is usually safer for the applicant, if he is not the inventor, to obtain the inventor's consent in writing, before making the application, and preserve it in case his right to obtain the patent should afterwards be questioned.

The duration of the patent is 15 years, but patents are usually taken for one year and renewed by payment of an annual tax. Patents of addition are granted for alterations or improvements in any invention previously patented in Germany.

Such patents are continued in force by the prolongation of the original patents to which they relate, and no separate annuities are required.

The law requires that the invention must be *worked* in Germany within three years from the date of the grant, but this does not mean that it must be *manufactured* in Germany, as the provisions of the Patent Act will be fully complied with if the *patented article* is placed on the market and *advertised for sale* in the Empire, although it may have been manufactured elsewhere.

Persons who deliberately manufacture or sell a patented article, without the consent of the patentee or owner of the patent are liable to a fine of 5,000 marks (about \$1,800), or to imprisonment for one year, in addition to payment of damages to the party aggrieved.

DESIGNS.—Ornamental designs may be protected by registration.

GREAT BRITAIN.

POPULATION 31,628,338—PRINCIPAL MANUFACTURES, COTTON, WOOL, SHODDY, WORSTED, FLAX, SILK, IRON, STEEL, COPPER, BRASS, AGRICULTURAL IMPLEMENTS, GLOVES, PAPER, BEER, HATS, GLASS, POTTERY, SOAP, LACE, IRON SHIPS, LINEN, WHISKEY, COMBS, STEAM ENGINES, FLANNEL, ETC.

WHO MAY OBTAIN A PATENT.—A British Patent can be obtained either by the true inventor, or by a person to whom the invention has been communicated. In the first case, the applicant declares himself to be the true and first inventor, and in the second case, *that the invention is a communication*. Any person (not a resident in Great Britain) becoming acquainted with an invention, can obtain a perfectly valid British Patent therefor, by communicating it to a person residing in Great Britain (*for instance, to a Patent Solicitor in London, through a Patent Solicitor in New York*), and the real inventor has no remedy whatever afterwards, unless fraud can be *very clearly proved*. Hence, if an American inventor desires to obtain a British Patent for his invention, he should make the application *before his invention becomes public in this country*.

DURATION OF PATENT AND TERRITORY COVERED.—British Patents are granted for the term of fourteen years, subject to the payment of a stamp duty of £50 before the expiration of three years, and £100 before the expiration of seven years. A British Patent covers Great Britain, Ireland, the Channel Islands, and the Isle of Man.

VALIDITY OF PATENT AS AFFECTED BY PRIOR PUBLICATION OR USE.—“A valid British Patent cannot be obtained, if, prior to the application for “the same, the invention has become public, in Great Britain, by means of “books or otherwise; but the amount of information given by the prior publication, whatever may be its nature, must, in order to avoid a subsequent patent, “be equal to that required to be given by a *specification*—that is to say, it must “be enough to enable the public to carry the invention into practical use. Publication or use *in a foreign country* does not affect the validity of a British “Patent.”

The printed copies of American specifications issued by the U. S. Patent Office, do not reach England until *about six months after the date of the American Patents*. The Official Gazette of the U. S. Patent Office, published weekly, and containing the *claims* of patents, and partial illustrations of the inventions referred to in such claims, reaches England in about *two weeks after its date*, but this publication rarely contains information sufficient to invalidate a British Patent granted subsequently, and before the complete specifications of the American Patent are received at the library of the English Patent Office.

WORKING.—The invention does not have to be worked within the Kingdom, and may be imported.

THE APPLICATION.—The applicant may take the patent out *at once* by paying the full cost (\$250.00), or he may proceed by three or four *steps*, and thus graduate the payment of the fees. For instance, he may file, first, what is called a

provisional specification. This protects his invention for a period of *six months*, during which time the specification is considered *confidential and kept secret*. If he proceeds in this way the proceedings would be as follows:

1st Step.—Application for provisional protection (cost \$75, payable in advance). *2nd Step.*—Notice to proceed (cost \$37.50, payable within four months of the date of application). *3rd Step.*—Sealing (issue of patent), (cost \$62.50, payable within five months of the date of application). *4th Step.*—Filing final specification (cost \$75.00, payable within six months of the date of application). Or he can file a *complete* instead of a *provisional* specification, and then the proceedings would be the same as above, except that the 4th step would be omitted, and the cost of the first would be \$125 instead of \$75.

DESIGNS.—Useful and ornamental designs may be protected by registration. The following classes of articles of manufacture and substances to which designs may be applied, can be registered: Articles composed wholly or chiefly of metal, wood, glass, earthenware, bone, ivory, *papier-maché*, or other solid substances; paper-hangings, carpets, floor-cloths, oil-cloths, shawls, yarn, thread or warp, woven-fabrics, lace and other articles.

The term of the copyright varies from one to five years.

ITALY.

POPULATION 26,801,154—PRINCIPAL MANUFACTURES, SHIP BUILDING, MUSICAL INSTRUMENTS, SILKS, EARTHENWARE, STRAW-GOODS, ARTIFICIAL FLOWERS, MACARONI, ETC.

Any person may obtain a patent, whether he is the inventor or not. The duration of the patent is limited to 15 years, and it may be secured for periods varying from one to fifteen years. If the patent is granted for a term not exceeding five years, the invention must be *worked* in Italy within *one year* from the date of the patent. If the term exceeds five years, the invention must be *worked* within *two years*, and during every two years thereafter.

Medicines are not patentable.

Infringers are liable to a fine of about \$100, and may be assessed damages, and the articles made by them in infringement of the patented invention can be confiscated.

PATENTS OF ADDITION.—Are granted at any time during the life of a patent, for modifications of an invention patented in Italy, and the annual taxes paid on the original patent keep the patent of addition in force.

DESIGNS.—Ornamental designs can be protected by registration.

NORWAY.

POPULATION 1,806,900—PRINCIPAL MANUFACTURES, LIQUORS, CLOTHS, SILKS, COTTON, LEATHER, TOBACCO, SUGAR, METALS, PAPER.

Any one can obtain a patent. The term is limited to 10 years, and is fixed by the Government in each case. The invention must be *worked* in Norway within one year from the date of the patent.

PORTUGAL.

POPULATION 4,745,024—PRINCIPAL MANUFACTURES, COTTON, WOOL, SILK, PAPER, CHEMICALS, EARTHENWARE, PORCELAIN, LACE, COPPER AND TINWARE, RIBBONS, EMBROIDERIES, HATS, SOAP, GLASS, TOBACCO.

Duration of patents limited to 15 years. Granted to the first inventor or importer. May be first procured for 5 years, and thereafter prolonged to the full term of 15 years, by paying an additional Government fee. The invention must be *worked* at some time during the first half of the term, and the *working* must be public at certain stated times.

RUSSIA.

POPULATION 88,399,808—PRINCIPAL MANUFACTURES, WOOLEN GOODS, SILK, COTTON, LINEN, LEATHER, TALLOW, CANDLES, SOAP, SUGAR AND METALLIC WARES.

Patents are granted for *three, five or ten* years, at the option of the applicant. But the patent cannot be extended or prolonged beyond the original term. No patents are granted for inventions adapted only to Government uses.

Patents of Importation are limited in duration to the term of the prior foreign patent.

The invention must be worked within the Empire at some time during one-fourth of the term.

SWEDEN.

POPULATION 4,429,713—PRINCIPAL MANUFACTURES ABOUT THE SAME AS NORWAY.

The term of a patent is fixed by the Government in each case, and never exceeds 15 years. The application should be made in the name of the inventor, if possible. The invention must be *worked* at some time within two years from the date of the grant.

SPAIN (including CUBA).

POPULATION 18,209,471—PRINCIPAL MANUFACTURES, COTTON, METALLIC WARES, SILK, WOOLEN AND LINEN GOODS, LEATHER, FIRE-ARMS, GLASSWARE, SUGAR, MOLASSES, COFFEE, WAX, TOBACCO AND SEGARS.

Patents may be obtained by any one. The term cannot exceed 20 years, but the patent may be taken out for *one* year, and extended from year to year, by paying an annual fee or tax to the Government. The invention must be worked within *two* years from the date of *issue* of the patent.

SCHEDULE OF FEES

FOR OBTAINING LETTERS PATENTS IN THE PRINCIPAL FOREIGN COUNTRIES, INCLUDING ALL GOVERNMENT FEES AND TRANSLATIONS IN EACH CASE AND THE COST OF DRAWINGS.

Argentine Republic	{ Patent of Invention	\$1,000 00
	{ " " Importation	1,500 00
Australia	{ New South Wales	300 00
	{ Victoria	300 00
	{ Queensland	300 00
	{ Tasmania	250 00
	{ South and West Australia	300 00
	{ New Zealand	200 00
Austria and Hungary	. . . . .	100 00
Belgium and Holland	. . . . .	75 00
Canada	. . . . .	50 00
Denmark and Iceland	. . . . .	150 00
France	. . . . .	100 00
Germany	. . . . .	100 00
Great Britain	. . . . .	250 00
Italy	. . . . .	100 00
Norway	. . . . .	200 00
Portugal	. . . . .	250 00
Russia	{ 3 years	300 00
	{ 5 "	350 00
	{ 10 "	550 00
Sweden	. . . . .	250 00
Spain, including Cuba	. . . . .	100 00

Information relating to patents in other foreign countries, furnished upon application, and special terms made when patents for the same invention are applied for in more than one country at the same time.

PART III.

GENERAL INFORMATION.

GENERAL INFORMATION.

COMMENCEMENT OF THE YEAR.

By the reformation of the calendar by Pope Gregory XIII., the year began on the first of January, and, consequently, whenever and wherever the *NEW STYLE* of reckoning time was adopted, then and there the year commenced on this day.

Previous to the use of the Gregorian Calendar, the years had different days of beginning at various times in the same and different countries, and occasionally at the same time in the same country.

In most countries it began on one of the following days :

Christmas-day, the 25th of December.

Circumcision-day, the 1st of January.

Lady-day, the 25th of March.

Easter-day, the day of the Resurrection of our Lord.

In England, in the seventh, and so late as the thirteenth century, the year began on Christmas-day; but in the twelfth century the Anglican Church commenced the year on the 25th of March, as did also the civilians of the fourteenth century. This continued until 1752, the time of adoption of the new style. By this it appears that two modes of reckoning the commencement of the year have generally existed in Great Britain and its colonies, causing what are called the *CIVIL, ECCLESIASTICAL, or LEGAL, YEAR*, and the *HISTORICAL YEAR*. The last named of these has commenced on the 1st of January for a long period of time.

In New York, under the Dutch, the new style was used; but the English, in 1662, introduced the old style, which continued till 1752, when the new style was restored.

In Canada, new style was uniformly employed; and old style in New England. Hence, early dates seem to be given differently, according to the place of the writer's residence.

In order to prevent, as far as possible, the occurrences of error by the use of the two styles, it is usual to give the dates prior to 1752, thus: $\frac{1}{2}$ January, 1675.

TO ASCERTAIN THE LENGTH OF THE DAY AND NIGHT.

At any time of the year add 12 hours to the time of the Sun's setting, and from the sum subtract the time of rising for the length of the day. Subtract

the time of setting from 12 hours, and to the remainder add the time of rising next morning for the length of the night. These rules are equally true for apparent time.

TO GET CORRECT TIME.

When the shadow cast by the Sun reaches the noon-mark, set the clock at the time given in calendar pages of most almanacs in the column of "Sun at Noon-mark," and it will be exactly right. If a meridian line is used instead of a noon-mark, the passing the lines by the Sun's centre is the moment for setting the clock. Any skilful surveyor can make a noon-mark or meridian lines of small brass or copper wires. In doing so, he must allow for the variation of the magnetic needle from a *true* or astronomical north and south line.

TRUE TIME.

Two kinds of time are used in almanacs—*clock* or *mean-time* in some, and *apparent* or *sun-time* in others. *Clock-time* is always *right*, while *sun-time* *varies* every day. People generally suppose it is twelve o'clock when the Sun is due south, or at a properly-made noon-mark. But this is a mistake. The Sun is seldom on the meridian at *twelve o'clock*. In most almanacs the time used is *clock-time*, and the time when the Sun is on the meridian or at the noon-mark, is usually given for every day in the year on each calendar page. This affords a ready means of obtaining correct time, and for setting a clock by using a noon-mark, adding or subtracting as the Sun is fast or slow.

DIVISIONS OF TIME.

A *Solar Day* is measured by the rotation of the earth upon its axis, and is of different lengths, owing to the ellipticity of the earth's orbit and other causes; but a mean solar day, recorded by the time-piece, is twenty-four hours long.

An *Astronomical Day* commences at noon, and is counted from the first to the twenty-fourth hour. A *Civil Day* commences at midnight, and is counted from the first to the twelfth hour, when it is recounted again from the first to the twelfth hour. A *Nautical Day* is counted as a Civil Day, but commences, like an Astronomical Day, from noon.

A *Calendar Month* varies in length from 28 to 31 days. A *Mean Lunar Month* is 29 days, 12 hours, 44 minutes, 2 seconds, and 5.24 thirds.

A *Year* is divided into 365 days.

A *Solar Year*, which is the time occupied by the Sun in passing from one Vernal Equinox to another, consists of 365.24244 solar days, or 365 days, 5 hours, 48 minutes and 49.536 seconds.

A *Julian Year* is 365 days. A *Gregorian Year* is 365.2425 days; every fourth year is *Bissextile*, or Leap-Year, and is 366 days. The error of the Gregorian computation amounts only to one day in 3571.4286 years.

LEAP YEAR.

Every year the number of which is divisible by four without a remainder is a leap-year, except the last year of the century, which is a leap-year only when divisible by four hundred without a remainder. Thus the year 1900 will not be leap-year.

RATES OF POSTAGE.

Letters, prepaid by stamps, 3 cts. each $\frac{1}{2}$ oz. or fraction thereof, to all parts of the United States; forwarded to another Post Office without charge, on request of the person addressed; if not called for, returned to the writer free, if endorsed with that request. If the stamp is omitted, the letter is forwarded to the Dead Letter Office, and returned to the writer. For *Registering* letters the charge is 10 cts. additional. *Drop* or *Local* letters 2 cts. each $\frac{1}{2}$ oz. prepaid. Stamped *Postal Cards*, furnished only by Government, 1 ct. each; if anything except a printed address slip is pasted on a postal card, or anything but the address written on the face, letter postage is charged. Postage on all *Newspapers* and *Periodicals* sent from newspaper offices to any part of the United States, to regular subscribers, must be paid in advance at the office of mailing.

Second Class Matter.—Periodicals issued at regular intervals, at least four times a year, and having a regular list of subscribers, with supplements, sample copies, 2 cents a pound; periodicals, other than weekly, if delivered by letter-carrier, 1 cent each; if over 2 oz., 2 cents each.

Third Class Matter, not exceeding 4 pounds.—Printed matter, books, proof-sheets corrected or uncorrected, unsealed circulars, inclosed so as to admit of easy inspection without cutting cords or wrapper, 1 cent each for 2 ounces.

Fourth Class Matter, not exceeding 4 pounds, embracing merchandise and samples, excluding liquids, poisons, greasy, inflammable or explosive articles, live animals, insects, etc., 1 cent an ounce.

POSTAGE TO CANADA AND BRITISH NORTH AMERICAN POSSESSIONS, 3 cts. per $\frac{1}{2}$ oz., must be prepaid; otherwise, 6 cts.

FOREIGN POSTAGE.—To France, Germany, Austria, Belgium, Denmark (including Iceland and the Faroe Islands), Egypt, Spain (including the Balearic Isles, the Canary Islands, the Spanish Possessions on the northern coast of Africa, and the Postal establishments of Spain upon the western coast of Morocco), Great Britain (including the Island of Malta), Greece, Italy, Norway, the Netherlands, Portugal (including Madeira and the Azores), Roumania, Russia, Servia, Sweden, Switzerland, Tunis, Wallachia and Turkey, for prepaid letters, 5 cts. per $\frac{1}{2}$ oz. Unpaid letters, 10 cents. Postal cards, 2 cts. each. Newspapers, not over four ounces, 2 cts. each. Books, other printed matter, patterns, legal documents, photographs, etc., 2 cts. for each 2 ozs. Registration fee on all Guinea (British), 10 cts; India (British), Italian mail, 10 cts.; newspapers 4 cts. each.

Money, in sums not exceeding \$50, can be sent with safety through the principal Post Offices of the United States, by buying P. O. Money Orders:

Fees, for not exceeding \$15, 10 cts.; \$15 to \$30, 15 cts.; \$30 to \$40, 20 cts.; \$40 to \$50, 25 cts.

					<i>To Canada.</i>	<i>To Germany.</i>
On Money Orders not exceeding \$10.....					20 cts.	25 cts.
" " " " " \$10 to \$20.....					40 "	50 "
" " " " " \$20 to \$30.....					60 "	75 "
" " " " " \$30 to \$40.....					80 "	\$1 00 "
" " " " " \$40 to \$50....					\$1 00 "	\$1 25 "

Newspapers and other printed papers, Postal Cards and registered articles unpaid or insufficiently prepaid will not be forwarded. Other articles, when unpaid or insufficiently paid, will be charged as unpaid letters, after deducting the value of the stamped envelopes or postage stamps employed.

Gold and silver money, jewels, or precious articles, or any other article liable to customs' duties, are excluded from the mails.

To the following, postage must be prepaid: To West Indies, except those on the Postal Union, 5 cts.; Ascension Island, 15 cts.; Aspinwall direct, 5 cts., *via* St. Thomas, 15 cts.; Bahamas, 15 cts.; Bolivia, Chili, 17 cts.; China, 17 cts.; U. S. of Columbia, direct, 5 cts., *via* St. Thomas, 13 cts.; Ecuador, 17 cts.; Fiji Islands, 5 cts.; Greytown, 5 cts.; Hawaiian Kingdom, 6 cts.; Honduras, *via* St. Thomas, 13 cts.; Madagascar, 28 cts.; Mexico, 10 cts.; Morocco, 15 cts.; Navassa, 5 cts.; Newfoundland, 5 cts.; New South Wales and New Zealand, direct, 12 cts., *via* Southampton, 15 cts., *via* Brindisi, 19 cts.; Nicaragua, 5 cts.; Panama, 5 cts.; *via* St. Thomas, 13 cts.; Paraguay, Patagonia and Peru, 17 cts.; Queensland, 12 cts.; Salvador, 10 cts., *via* St. Thomas, 13 cts.; Santa Marta, 13 cts.; Shanghai, 5 cts.; Siam, *via* Brindisi, 19 cts.; St. Bartholomew, 13 cts.; Tripoli, 5 cts.; Uruguay, by sailing vessel, 5 cts., by steam, *via* Brazil, 27 cts.; Venezuela, 10 cts., *via* St. Thomas, 13 cts.; Victoria, 12 cts.; Zanzibar, 10 cts.

OUR NORTHERN BOUNDARY.

Not one in a thousand, perhaps, of the 50,000,000 of people living in the United States, knows how their country is bounded on the line between the United States and the British Territory. It will be interesting, therefore, to know how the northern boundary has been traced and marked. The work is now completed, except as to the Territory of Alaska, ceded by Russia to us under the treaty of 1867. Ever since the Treaty of Ghent we have been establishing our northern boundary with Britain until a year or two ago, when the work was finally completed by a joint commission, consisting of Major Donald R. Cameron, Royal Artillery; Captain S. Anderson, Royal Engineers; and Captain A. C. Ward, Royal Engineers, for Great Britain, and Archibald Campbell and Captain W. J. Twining, United States Army, for our Government. The commission experienced difficulty in discharging their duties, from the errors committed by former commissioners. In April, 1870, while engaged in locating a military reservation for a post near Pembina, our engineers discovered that the commonly received boundary line between the British possessions and the United States at that place was 4,700 feet south of the forty-ninth parallel, and if run on west from such an initial point would throw the fort of the Hudson Bay Company at Pembina into the United States. Here was indeed a difficulty, and the officers

at once communicated the facts to their Government. The President, General Grant, sent the information to the British Government, and Great Britain requested the consent of the United States to occupy the fort of the Hudson Bay Company until the matter could be determined. Of course, such a reasonable request was at once granted. The President then sent a message to Congress recommending the establishment of a joint commission to fix the true boundary line between the two countries, and Congress assented, appropriating \$100,000 by joint resolution to carry out the work. The appropriation was not available until 1873, when the work was begun, as above stated, by a joint commission of the two Governments.

The northern boundary is marked by stone cairns, iron pillars, wood pillars, earth mounds, and timber posts. A stone cairn is $7\frac{1}{2}$ feet by 8 feet, an earth mound 7 feet by 14 feet, an iron pillar 8 feet high, 8 inches square at the bottom, and 4 inches at the top; timber posts 5 feet high and 8 inches square. There are 382 of these marks between the Lake of the Woods and the base of the Rocky Mountains. That portion of the boundary which lies east and west of the Red River Valley is marked by cast-iron pillars at even-mile intervals. The British placed one every two miles and the United States one between each British post. Our pillars, or markers, were made at Detroit, Mich. They are hollow iron castings, three-eighths of an inch in thickness, in the form of a truncated pyramid, 8 feet high, 8 inches square at the bottom and 4 inches at the top, as before stated.

They have at the top a solid pyramidal cap, and at the bottom an octagonal flange one inch in thickness. Upon the opposite faces are cast in letters, two inches high the inscriptions, "Convention of London," and "October 20, 1818." The inscriptions begin about four feet six inches above the base, and read upward. The interiors of the hollow posts are filled with well-seasoned cedar posts, sawed to fit, and securely spiked through spike-holes cast in the pillars for the purpose. The average weight of each pillar when completed is eighty-five pounds. The pillars are all set fourteen feet in the ground, with their inscription faces to the north and south, and the earth is well settled and stamped about them. For the wooden posts well-seasoned logs are selected and the portion above the ground painted red, to prevent swelling and shrinking. These posts do very well, but the Indians cut them down for fuel, and nothing but iron will last very long. Where the line crosses lakes, monuments of stones have been built, the bases being in some places eighteen feet under water, and the tops projecting eight feet above the lake's surface at high-water mark. In forests the line is marked by felling the timber a rod wide, and clearing away the underbrush. The work of cutting through the timbered swamps was very great, but it has been well done, and the boundary distinctly marked by the commissions the whole distance from Michigan to Alaska.

WHAT IS NICKEL?

Since the convenient five-cent coin which, in common talk, is called "a nickel," has come into general circulation, the question above is asked, either mentally or orally, hundreds of times every day, and but few get an intelligent

answer. In China and India a white copper, called pack tong, has long been known, and has been extensively used both there and in Europe for counterfeit silver coin. About the year 1700 a peculiar ore was discovered in the copper mines of Saxony, which had the appearance of being very rich, but in smelting it yielded the copper, and the miners called it kupfer-nickel, or false copper, a name given it from its yellowish-red color.

Nickel only occurs in the native state in meteoric stones, in which it is always present in association with the iron which forms the principal part of these masses. It is found in tolerable abundance in Saxony, Westphalia, Hungary, Sweden, etc., where it occurs in combination with arsenic. The metal is largely used for the purpose of making German silver and other alloys.

In 1754 Constadt announced the discovery of a new metal in kupfer-nickel. It was in combination with arsenic, from which he could relieve it only in parts. The alloy of nickel and arsenic which he obtained was white, brittle and very hard, and had a melting point nearly as high as cast-iron. It was not until 1823 that pure nickel was obtained by analysis of German silver, which had for a number of years been produced at Suhl, in Saxony. Its composition was ascertained to be copper 10 parts, zinc 5, and nickel 4. If more nickel be used the alloy is as white as silver and susceptible of a very high polish, but becomes too brittle and hard to be hammered or rolled, and can be worked only by casting. Pure nickel is a white metal which tarnishes readily in the air. Unlike silver, it is not acted on by the vapor of sulphur, and even the strong mineral acids attract it but slightly.

Nickel has the hardness of iron, and, like it, has strong magnetic properties, but cannot be welded and is soldered with difficulty. Pure nickel has heretofore been used chiefly for plating, for which purpose its hardness and power to resist atmospheric influences admirably adapt it. Within the last year the French have succeeded in rolling the metal into plates, from which spoon and other table furniture may be pressed. Nickel bronze, which consists of equal parts of copper and nickel, with a little tin, may be cast into very delicate forms, and is susceptible of a high polish. Mines of nickel are worked at Chatham, Conn., and Lancaster, Pa., and it is said to be found at Mine La Motte, Mo., and at several points in Colorado and New Mexico, where but little attention is paid to it.

It is extensively mined in Saxony and in Sweden, but the late discovery of a new ore (a silicate of nickel) in New Caledonia will probably suspend the use of the arsenical ores, and yet bring nickel into common use. Switzerland, in the year 1852, made a coin of German silver, which is identical in composition with our nickel coin. The United States made nickel cents in 1856, and eight years later coined the five-cent pieces. Belgium adopted it in 1870, and Germany in 1873. England has lately coined pennies for Jamaica, but at home she and France adhere to the clumsy copper small change.

Several new processes have recently been introduced for the use of nickel in plating, and it is probable that its use in the mechanic arts will soon be widely extended. Its application to many purposes of use and ornament offers an inviting field to the inventor, and it seems probable that research in this direction will amply repay the first discoverers of new methods.

SOME NOTABLE EVENTS AND DISCOVERIES.

- Almanacs first printed by Purbach, in Vienna, 1457.
- America discovered by the Northmen A. D. 985; by Columbus, 1492, Oct. 12.
- Anaesthesia discovered 1844.
- Balloon ascension first made near Lyons, France, 1783.
- Bank of Venice, first in Europe, 1171.
- Bank of England established 1694.
- Bank of North America established 1781.
- Bank of United States, Phila., 1st charter 1791, Feb. 25; 2nd charter 1816; expired 1836, March 3.
- Boston fire 1873, Nov. 9. Loss \$73,609,000.
- Chicago fire, Oct., 1871. Loss, \$200,000,000.
- Constitution ratified by States:
1. Delaware, unanimously, Dec. 7, 1787.
 2. Pennsylvania, vote 46 to 23, Dec. 12, 1787.
 3. New Jersey, unanimously, Dec. 18, 1787.
 4. Georgia, unanimously, Jan. 2, 1788.
 5. Connecticut, vote 128 to 40, Jan. 9, 1788.
 6. Massachusetts, vote 157 to 168, Feb. 6, 1788.
 7. Maryland, vote 63 to 12, April 28, 1788.
 8. South Carolina, vote 149 to 73, May 23, 1788.
 9. New Hampshire, vote 57 to 47, June 21, 1788.
 10. Virginia, vote 89 to 79, June 25, 1788.
 11. New York, vote 30 to 25, July 26, 1788.
 12. North Carolina, vote 193 to 75, Nov. 21, 1789.
 13. Rhode Island, by a majority of 2, May 29, 1790.
- Copyright law first passed by Congress (term 14 years), 1790, May 31.
- radically amended and extended to 28 years (with renewal for 14 more), 1831.
- consolidated and records transferred to Washington, 1870, July 8.
- Cotton first raised in United States, Virginia, 1621, first exported from U. S. 1747.
- Cotton gin invented by Eli Whitney, 1793.
- Education, Bureau of, established 1867, March 2.
- Electoral Commission Act app'd 1877, Jan. 29.
- Electric Light, invented by Lodyguin and Kossloff, Russians, London, 1874.
- Jablochhoff candle successful in Paris streets, 1878.
- Sawyer-Mann electric lamp, United States, 1878.
- T. A. Edison's experiments in electric lighting, 1878-80.
- Emancipation proclamation, 1863, Jan. 1.
- Engraving, Wood, 1423, Line or Steel, 1450.
- Envelopes first used for letters, 1839.
- Ether first used in surgical operations, 1844.
- Express, first American, by W. F. Harnden, N. Y. to Boston, 1821.
- Ferries, operated by steam, first used between New York and Brooklyn, 1824.
- Fire Company, Union, Phila., first volunteer company in America, 1736.
- Flag, American, first used by Washington at Cambridge, 1776, Jan. 1.
- legally established by Congress, 1777, June 14.
- Garfield assassinated July 2, 1881, died Sept. 19, 1881.
- Gas illuminating, first used, Cornwall, Eng., 1792; in U. S., Boston, 1822.
- Glass first used for windows in England, 674; made in Va., 1615; Mass., 1639.
- Gold first discovered in California, 1848.
- Gunpowder, used by Chinese, A. D. 80.
- Greek fire used by Byzantines, A. D. 668.
- re-discovered by monk Schwartz, A. D. 1330.
- Guiteau convicted Jan. 25, 1882.
- Homoeopathy introduced into the United States, 1825.
- Independence, Declaration of, 1776, July 4.
- Insurance, Fire, first office in America. Boston, 1724.
- Life, first, London, 1772; first in America, Phila., 1812.
- Marine, A. D. 533; first in England about 1598; first in America, Phila., 1721.
- Iron Steamships, first, Great Britain, 1843.
- Jamestown, Va., first permanent English settlement in America, founded 1607.
- Kerosene first used for illuminating purposes, 1826.
- Knives, first in England, about 1550.
- Lee's surrender to Gen. Grant at Appomattox C. H., Va., 1865, April 12.
- Library, first, American, Harvard College, Cambridge, 1638.
- First subscription, Phila., 1731.
- Lightning rods, first used by Benj. Franklin about 1752.
- Lincoln, assassination of, 1865, April 14.
- London, Great fire of, 1666, Sept. 26.
- Plague in 1665.
- Magna Charta signed 1215.
- Matches, friction, first used, 1829.
- Monroe Doctrine declared in Pres. Monroe's message, 1823, Dec. 2.
- Musical notes first used 1238; printed, 1502.
- Needles, modern, first came into use, 1545.
- Newspaper, first authentic, 1494.
- first daily, Frankfort Gazette, 1615.
- first in England, Weekly News, 1622.

- Newspaper, first French, *Gazette de France*, Paris, 1631.
- first attempt at parliamentary reporting, 1641.
- first advertisement appeared in 1648.
- first American, "Publick Occurrences, Foreign and Domestick," Boston, 1690, Sept. 25.
- Newspaper, first English daily, London, *Daily Courant*, 1702.
- first continuously printed in America, *Boston News Letter*, 1702.
- first daily in United States, "The Pennsylvania Packet," 1784.
- Organs, first authentic use of, 755; in England, 951.
- Paper made by Chinese, from silk, 120 B. C.; from vegetable fibre A. D. 651; from cotton A. D. 711; from rags, 1085.
- Patent right law, first enacted in U. S., 1790, April 15.
- Pencils, leaden styles, used A. D. 50.
- modern, used in England, 1565.
- Pens, steel, first made, 1803; gold, first used about 1825.
- Phonograph invented by T. A. Edison, 1877.
- Photographs first produced in England, 1802 perfected, 1841.
- Piano-forte invented in Italy, about 1710.
- Pilgrims, landing at Plymouth, Mass., 1620, Dec. 21 (commonly called Dec. 22).
- Pins used in England about 1450; in America, machine-made, 1832.
- Post-Office first established, between Vienna and Brussels, 1516.
- Postage stamps first used in England, 1840; in the United States, 1847.
- Printing: clay tablets used by Assyrians and Babylonians, B. C.
- Wooden blocks used by Chinese A. D. 952.
- Block books: *Biblia Pauperum*, 1420.
- movable types, L. Coster, of Haarlem, 1423.
- J. Gutenberg, of Mentz, 1438.
- First Bible, Faust and Schoeffer, 1456.
- First book printed with date, Latin Psalter, Faust and Schoeffer, 1457.
- First book in English, "History of Troy," printed at Cologne, by William Caxton, 1471.
- First book printed in England with date, Caxton's "Game and Playe of the Chesse," 1474.
- first in America, *Escala Espiritual* of Chinaco, printed by Juan Hablas, Mexico, 1535.
- first press in the United States, at Cambridge, Mass., John Daye, 1639.
- Pyramids first erected, 2170 B. C.
- Railroad, Passenger, first opened in England, 1825, Sept. 27.
- Freight—first in the United States, at granite quarries, Quincy, Mass., 1826.
- Passenger, first in America, Baltimore and Ohio, 1828.
- Railroad, Steam, first in New York State, Albany to Schenectady, 16 miles, 1830.
- Resumption of Specie payments in U. S., act approved 1875, Jan. 14; took effect 1879, Jan. 1.
- Revolutionary war, beginning, battle of Lexington, 1775, April 19.
- end of, last battle, Combahee, 1782, Aug. 27.
- preliminary treaty of peace, 1782, Nov. 30.
- Savannah, first steamer crossed the Atlantic, 25 days, Savannah to Liverpool, 1819, May 24.
- Sewing Machine first patented, England, 1755.
- first complete, E. Howe (American), 1846.
- Sleeping cars first used, 1858: Pullman's patent, 1864.
- Statutes of the United States, first revised and codified, 1873.
- Steam Engine, boiler discovered by Marquis of Worcester, 1663.
- Newcomen's engine patented, 1705.
- Perfected by James Watt, 1773.
- High pressure engine invented by Oliver Evans (American), 1779.
- Steam vessels, Papin, France, 1707.
- Jonathan Hulls, England, 1736.
- William Henry, Conestoga River, Pa., 1763.
- James Rumsey, Md., 1786.
- John Fitch, Delaware River, 1786.
- Robert Fulton, N. Y. to Albany, 1807.
- Sugar cane first cultivated in U. S., near New Orleans, 1751, first sugar mill, 1758.
- Telegraph, first electric, Paddington to Drayton, England, 1835.
- Morse's, invented 1835.
- first in operation in America, Washington to Baltimore, 1844, May 27.
- submarine cable, first laid between Dover and Calais, 1851.
- first Atlantic cable operated, 1858.
- Telephone (speaking), A. Graham Bell, first presented Phila. Centennial Exhibition, 1876: practically successful as a telegraph, 1877, May 14.
- Telescope, invented 1608.
- Tobacco introduced into England from Virginia, 1583.
- Vaccination discovered by Dr. Jenner, England, 1796.

Washington inaugurated first President, 1789,
April 30.
Watches first made in Nuremburg, 1477.
Waterloo, battle of, 1815, June 18.

Yellowstone National Park, Act of Congress,
1871, Feb. 28.
Yorktown, surrender of Cornwallis to Wash-
ington, 1781, Oct. 19.

DATES OF ADMISSION

OF THE STATES TO THE UNION, WITH THEIR AREA IN SQUARE MILES AND ACRES.

THE THIRTEEN ORIGINAL STATES.	Ratified the Constitution.	Area of the Original States.	
		In Square Miles.	In Acres.
New Hampshire.....	June 21, 1788	9,280	5,939,300
Massachusetts.....	Feb. 6, 1788	7,800	4,992,000
Rhode Island.....	May 29, 1790	1,306	835,840
Connecticut.....	Jan. 9, 1788	4,750	3,040,000
New York.....	July 26, 1788	47,000	30,080,000
New Jersey.....	Dec. 18, 1787	8,320	5,324,800
Pennsylvania.....	Dec. 12, 1787	46,000	29,440,000
Delaware.....	Dec. 7, 1787	2,120	1,356,800
Maryland.....	April 28, 1788	11,124	7,119,360
Virginia.....	June 25, 1788	61,352	39,265,280
North Carolina.....	Nov. 21, 1789	50,704	32,450,560
South Carolina.....	May 23, 1788	34,000	21,760,000
Georgia.....	Jan. 2, 1788	58,000	37,120,000

STATES ADMITTED.	Date of Act Organizing Territory.	Date of Act Admitting State.	Date Admission Took Effect.	Area of Admitted States and Territories.	
				In Sq. Miles.	In Acres.
Kentucky.....	(Out of Va.)	Feb. 4, 1791	June 1, 1792	37,080	24,115,200
Vermont.....	Out of N.H. & N.Y.	Feb. 18, 1791	Mar. 4, 1791	9,612	6,151,680
Tennessee.....	(Out of N. C.)	June 1, 1796	June 1, 1796	45,600	29,184,000
Ohio.....	Ord'n'e of 1787	Apr. 30, 1802	Nov. 29, 1802	29,964	25,576,960
Louisiana.....	March 3, 1805	Apr. 8, 1812	Apr. 30, 1812	41,346	26,461,440
Indiana.....	May 7, 1800	Dec. 11, 1816	Dec. 11, 1816	33,809	21,637,760
Mississippi.....	April 7, 1798	Dec. 10, 1817	Dec. 10, 1817	47,156	30,179,840
Illinois.....	Feb. 3, 1809	Dec. 3, 1818	Dec. 3, 1818	55,410	35,462,400
Alabama.....	March 3, 1817	Dec. 14, 1819	Dec. 14, 1819	50,422	32,462,080
Maine.....	(Out of Mass.)	Mar. 3, 1820	Mar. 15, 1820	35,000	22,400,000
Missouri.....	June 4, 1812	Mar. 2, 1821	Aug. 10, 1821	65,350	41,824,000
Arkansas.....	March 2, 1819	June 15, 1836	June 15, 1836	52,198	33,406,720
Michigan.....	Jan. 11, 1805	Jan. 26, 1837	Jan. 26, 1837	56,451	36,128,640
Florida.....	Mar. 30, 1822	Mar. 3, 1845	Mar. 3, 1845	59,268	37,931,520
Iowa.....	June 12, 1838	Mar. 3, 1845	Dec. 28, 1846	55,045	35,228,800
Texas.....	(Annexed.)	Mar. 1, 1845	Dec. 29, 1845	274,356	175,587,840
Wisconsin.....	April 20, 1836	Mar. 3, 1847	May 29, 1848	53,924	34,511,360
California.....	(Fr'm Mexico)	Sept. 9, 1850	Sept. 9, 1850	157,801	100,992,640
Minnesota.....	March 3, 1849	May 4, 1858	May 11, 1858	83,531	53,459,840
Oregon.....	Aug. 14, 1848	Feb. 14, 1859	Feb. 14, 1859	95,374	60,975,360
Kansas.....	May 30, 1854	Jan. 29, 1861	Jan. 21, 1861	80,891	51,770,240
West Virginia.....	(Out of Va.)	Dec. 31, 1862	June 19, 1863	23,000	14,720,000
Nevada.....	March 2, 1861	Mar. 21, 1864	Oct. 31, 1864	112,090	71,737,600
Nebraska.....	May 30, 1854	Feb. 9, 1867	Mar. 1, 1867	75,995	48,036,800
Colorado.....	Feb. 28, 1861	Mar. 3, 1875	Aug. 1, 1876	104,500	66,820,000

ORGANIZATION AND AREA OF TERRITORIES.

TERRITORIES.	Act Organizing Territory.	Area of the Territories.	
		In Square Miles.	In Acres.
New Mexico.....	Sept. 9, 1850	121,201	77,568,640
Utah.....	Sept. 9, 1850	84,476	54,064,640
Washington.....	Mar. 2, 1853	69,994	44,796,160
Dakota.....	Mar. 2, 1861	150,982	96,596,480
Arizona.....	Feb. 24, 1863	113,016	72,906,304
Idaho.....	Mar. 3, 1863	86,294	55,228,160
Montana.....	May 26, 1864	143,776	92,016,640
Wyoming.....	July 25, 1868	97,833	62,645,120
Indian.....	June 30, 1864	68,991	44,154,240
District of Columbia.....	July 16, 1790	164	41,060
Alaska.....	Mar. 3, 1791		
	July 27, 1868	577,390	365,529,600

PRESIDENTS AND VICE-PRESIDENTS OF THE U. S. FROM 1789-1882.

PRESIDENTS.			VICE-PRESIDENTS.		
No.	Name.	Qualified.	No.	Name.	Qualified.
1	George Washington.....	April 30, 1789	1	John Adams.....	June 3, 1789
		Mar. 4, 1793		".....	Dec. 2, 1793
2	John Adams.....	Mar. 4, 1797	2	Thomas Jefferson.....	March 4, 1797
3	Thomas Jefferson.....	Mar. 4, 1801	3	Aaron Burr.....	March 4, 1801
		Mar. 4, 1805	4	George Clinton.....	March 4, 1805
4	James Madison.....	Mar. 4, 1809		".....	March 4, 1809
		Mar. 4, 1813	5	Elbridge Gerry.....	March 4, 1813
5	James Monroe.....	Mar. 4, 1817		*John Gaillard.....	Nov. 25, 1814
		Mar. 5, 1821	6	Daniel D. Tompkins.....	March 4, 1817
6	John Quincy Adams.....	Mar. 4, 1825		".....	March 5, 1821
7	Andrew Jackson.....	Mar. 4, 1829	7	John C. Calhoun.....	March 4, 1825
		Mar. 4, 1833		".....	March 4, 1829
8	Martin Van Buren.....	Mar. 4, 1837	8	Martin Van Buren.....	March 4, 1833
9	Wm. Henry Harrison.....	Mar. 4, 1841	9	Richard M. Johnson.....	March 4, 1837
10	John Tyler.....	April 6, 1841	10	John Tyler.....	March 4, 1841
				*Samuel L. Southard.....	April 6, 1841
11	James K. Polk.....	Mar. 4, 1845		*Willie P. Mangum.....	May 31, 1842
12	Zachary Taylor.....	Mar. 5, 1849	11	George M. Dallas.....	March 4, 1845
13	Millard Fillmore.....	July 10, 1850	12	Millard Fillmore.....	March 5, 1849
14	Franklin Pierce.....	Mar. 4, 1853		*William R. King.....	July 11, 1850
			13	William R. King.....	March 4, 1853
15	James Buchanan.....	Mar. 4, 1857		*David R. Atchison.....	April 18, 1853
16	Abraham Lincoln.....	Mar. 4, 1861		*Jesse D. Bright.....	Dec. 5, 1854
	".....	Mar. 4, 1865	14	John C. Breckinridge.....	March 4, 1857
17	Andrew Johnson.....	April 15, 1865		Hannibal Hamlin.....	March 4, 1861
			16	Andrew Johnson.....	March 4, 1865
18	Ulysses S. Grant.....	Mar. 4, 1869		*Lafayette S. Foster.....	April 15, 1865
	".....	Mar. 4, 1873		*Benjamin F. Wade.....	March 2, 1867
			17	Schuyler Colfax.....	March 4, 1869
19	Rutherford B. Hayes.....	Mar. 5, 1877	18	Henry Wilson.....	March 4, 1873
20	James A. Garfield.....	Mar. 4, 1881		*Thomas W. Ferry.....	Nov. 22, 1875
21	Chester A. Arthur.....	Sept. 20, 1881	19	William A. Wheeler.....	March 5, 1877
			20	Chester A. Arthur.....	March 4, 1881
			21	*David Davis.....	Oct. 14, 1881

*Acting Vice-President and President *pro tem.* of the Senate.

STATE CAPITALS AND GOVERNORS IN 1882.

STATE.	CAPITAL.	GOVERNOR.
Alabama	Montgomery	Rufus W. Cobb.....D.
Arkansas	Little Rock	Thos J. Churchill.....D.
California	Sacramento	George C. Perkins.....R.
Colorado	Denver	Fred'k W. Pitkin.....R.
Connecticut	Hartford	Hobart B. Bigelow.....R.
Delaware	Dover	John W. Hall.....D.
Florida	Tallahassee	Wm. D. Bloxham.....D.
Georgia	Atlanta	Alfred H. Colquitt.....D.
Illinois	Springfield	Shelby M. Cullom.....R.
Indiana	Indianapolis	Albert G. Porter.....R.
Iowa	Des Moines	John H. Gear.....R.
Kansas	Topeka	John P. St. John.....R.
Kentucky	Frankfort	L. P. Blackburn.....D.
Louisiana	Baton Rouge	Louis A. Wiltz.....D.
Maine	Augusta	Harris M. Plaisted.....D.
Maryland	Annapolis	Wm. T. Hamilton.....D.
Massachusetts	Boston	John D. Long.....R.
Michigan	Lansing	David H. Jerome.....R.
Minnesota	St. Paul	John S. Pillsbury.....R.
Mississippi	Jackson	John M. Stone.....D.
Missouri	Jefferson City	Thos. T. Crittenden.....D.
Nebraska	Lincoln	Abimius Nance.....R.
Nevada	Carson City	John H. Kinkaid.....R.
New Hampshire	Concord	Charles H. Bell.....R.
New Jersey	Trenton	George C. Ludlow.....D.
New York	Albany	Alonzo B. Cornell.....R.
North Carolina	Raleigh	Thomas J. Jarvis.....D.
Ohio	Columbus	Charles Foster.....R.
Oregon	Salem	William W. Thayer.....D.
Pennsylvania	Harrisburg	Henry M. Hoyt.....R.
Rhode Island	Newport & Providence	A. H. Littlefield.....R.
South Carolina	Columbia	Johnson Hagood.....D.
Tennessee	Nashville	Alvin Hawkins.....R.
Texas	Austin	Oran M. Roberts.....D.
Vermont	Montpelier	Roswell Farnham.....R.
Virginia	Richmond	F. W. M. Holliday.....D.
West Virginia	Wheeling	Jacob B. Jackson.....D.
Wisconsin	Madison	William E. Smith.....R.

GOVERNORS OF THE TERRITORIES IN 1882.

TERRITORY.	CAPITAL.	GOVERNOR.
Arizona	Prescott	John C. Fremont.....R.
Dakota	Yankton	Neh. G. Ordway.....R.
Idaho	Boise City	John B. Neff.....R.
Montana	Helena	Benjamin F. Potts.....R.
New Mexico	Santa Fé	Lewis Wallace.....R.
Utah	Salt Lake City	Eli H. Murray.....R.
Washington	Olympia	William A. Newell.....R.
Wyoming	Cheyenne	John W. Hoyt.....R.

POPULATION OF THE CHIEF CITIES OF THE WORLD.

London.....	3,900,000	Constantinople.....	1,000,000	Glasgow.....	600,000
Paris.....	2,000,000	Berlin.....	966,838	Liverpool.....	525,000
Pekin.....	1,600,000	Philadelphia.....	846,980	Madrid.....	350,000
Canton.....	1,500,000	Calcutta.....	842,429	Saanghai.....	330,000
New York.....	1,206,577	Tokio.....	725,000	Rome.....	275,000
Vienna.....	1,030,170	St. Petersburg.....	700,000	Rio de Janeiro.....	260,000

SUPREME COURT OF THE UNITED STATES.

	CHIEF JUSTICES.	ASSOCIATE JUSTICES.	State Whence Appointed.	Term of Service.	Years of Service.	Born.	Died.
1	John Jay.....	1 John Rutledge.....	New York..	1789-1795	6	1745	1829
		2 William Cushing.....	S. Carolina..	1789-1791	2	1739	1800
		3 James Wilson.....	Mass.....	1789-1810	21	1733	1810
		4 John Blair.....	Penn.....	1789-1798	9	1742	1798
		5 Rob't H. Harrison....	Virginia....	1789-1796	7	1732	1800
		6 James Iredell.....	Maryland....	1789-1790	1	1745	1790
		7 Thomas Johnson.....	N. Carolina..	1790-1799	9	1751	1799
		8 William Patterson....	Maryland....	1791-1793	2	1732	1819
2	John Rutledge.....	9 Samuel Chase.....	New Jersey..	1793-1806	13	1745	1806
		10 Bushr'd Washington....	S. Carolina..	1795-1795	...	1739	1800
3	Oliver Ellsworth.....	11 Alfred Moore.....	Maryland....	1796-1811	15	1741	1811
		12 William Johnson.....	Connecticut..	1796-1801	5	1745	1807
4	John Marshall.....	13 Brockht Livingston....	Virginia....	1798-1829	31	1762	1829
		14 Thomas Todd.....	N. Carolina..	1799-1804	5	1735	181
		15 Joseph Story.....	Virginia....	1801-1835	34	1755	1835
		16 Gabriel Duval.....	S. Carolina..	1804-1834	30	1771	1834
		17 Smith Thompson.....	New York..	1806-1823	17	1757	1823
		18 Robert Trimble.....	Kentucky....	1807-1836	19	1765	1836
		19 John McLean.....	Mass.....	1811-1845	34	1779	1845
		20 Henry Baldwin.....	Maryland....	1811-1836	25	1752	1844
		21 James M. Wayne.....	New York..	1823-1845	22	1767	1845
		22 Philip P. Barbour.....	Kentucky....	1826-1828	2	1777	1828
5	Roger B. Taney	23 John Catron.....	Ohio.....	1829-1861	32	1785	1861
		24 John McKinley.....	Penn.....	1830-1846	16	1779	1846
		25 Peter V. Daniel.....	Georgia.....	1835-1867	32	1790	1867
		26 Samuel Nelson.....	Maryland....	1836-1864	28	1777	1864
		27 Levi Woodbury.....	Virginia....	1836-1841	5	1783	1841
		28 Robert C. Grier.....	Tennessee...	1837-1865	28	1778	1865
		29 Benj. R. Curtis.....	Alabama.....	1837-1852	15	1780	1852
		30 John A. Campbell.....	Virginia....	1841-1860	19	1785	1860
		31 Nathan Clifford.....	New York..	1845-1872	27	1792	1873
		32 Noah H. Swayne.....	New Hamp....	1845-1851	6	1789	1851
		33 Samuel F. Miller.....	Penn.....	1846-1869	23	1794	1870
		34 David Davis.....	Mass.....	1851-1857	6	1809	1874
		35 Stephen J. Field.....	Alabama.....	1853-1861	8	1811	...
6	Salmon P. Chase.....	36 William Strong.....	Maine.....	1858-1881	...	1803	1881
		37 Joseph P. Bradley.....	Ohio.....	1861-....	...	1805	....
		38 Ward Hunt.....	Iowa.....	1862-....	...	1816	....
7	Morrison R. Waite.....	39 John M. Harlan.....	Illinois.....	1862-1877	15	1815	....
		40 William B. Woods.....	California....	1866-....	...	1816	....
			Ohio.....	1864-1873	9	1808	1873
			Penn.....	1870-1880	10	1808	...
			New Jersey..	1870-....	...	1813	....
			Kentucky....	1872-....	...	1811	....
			Ohio.....	1874-....	...	1816	....
			Kentucky....	1877-....	...	1833	....
			Georgia.....	1880-....	...	1826	....

POPULATION OF THE UNITED STATES AT EACH CENSUS,

FROM 1790 TO 1880.

1790.	1800.	1810.	1820.	1830.
3,929,214	5,308,483	7,239,881	9,633,822	12,866,020
1840.	1850.	1860.	1870.	1880.
17,069,453	23,191,876	31,443,321	38,558,371	50,152,866

TABLE SHOWING THE GROWTH OF THE CHIEF AMERICAN CITIES.

CITIES.	1790.	1800.	1810.	1820.	1830.	1840.	1850.	1860.	1870.	1880.
Albany	3,498	5,349	9,356	12,630	24,238	33,721	50,763	62,307	69,422	87,584
Alleghany										
Baltimore	13,503	26,614	46,555	62,738	80,625	134,379	169,054	212,415	267,354	332,190
Boston	18,098	24,027	32,250	43,298	61,392	93,383	136,881	177,812	250,552	362,535
Brooklyn	1,603	3,298	4,402	7,175	12,042	36,233	96,838	266,661	366,099	566,680
Buffalo			1,508	2,095	8,653	18,213	42,261	81,129	117,714	149,500
Cambridge	2,115	2,453	2,323	3,295	6,078	8,409	15,215	26,060	39,634	52,740
Chicago						4,479	29,963	109,260	298,977	503,052
Cincinnati		750	2,540	9,614	24,831	46,338	115,436	161,044	216,239	255,809
Cleveland			547	606	1,076	6,071	17,034	43,417	92,829	155,946
Columbus				1,450	2,437	6,048	17,822	18,629	31,274	51,337
Detroit			770	1,422	2,222	9,102	21,019	45,619	79,577	116,027
Indianapolis					1,924	2,692	8,034	18,611	48,244	75,031
Jersey City						3,072	6,856	29,226	82,266	120,728
Kansas City								4,418	32,260	55,813
Louisville	200	350	1,357	4,012	10,352	21,210	43,194	68,033	100,753	126,566
Lowell					6,474	20,796	33,383	36,827	40,928	59,485
Milwaukee						1,700	20,061	45,246	71,440	115,712
Newark				6,507	10,953	17,290	38,894	71,914	105,059	186,400
New Haven		4,049	5,772	7,147	10,180	14,890	20,345	39,267	50,840	62,882
New Orleans	5,500	8,500	17,242	27,176	46,310	102,193	116,375	168,675	191,418	215,239
New York	33,131	60,489	96,373	123,706	203,007	312,710	515,547	805,651	942,292	1,206,577
Paterson						7,596	11,334	19,588	33,579	50,887
Philadelphia	42,520	70,287	96,664	108,116	167,188	258,037	340,045	562,529	674,022	846,980
Pittsburg		1,565	4,768	7,248	12,542	21,115	46,601	49,217	68,076	153,883
Providence	6,380	7,614	10,071	11,767	16,832	23,171	41,513	50,666	68,904	104,852
Richmond	3,761	5,537	9,735	12,046	16,060	20,153	27,570	37,910	51,038	64,670
Rochester				1,502	9,269	20,191	36,403	48,204	62,386	87,057
St. Louis			1,600	4,598	5,852	16,469	77,860	160,773	310,864	350,522
San Francisco						500	34,776	56,802	149,473	233,066
Syracuse				1,814	6,929	11,014	22,271	28,119	43,051	51,791
Toledo						1,222	3,829	13,768	31,584	50,143
Troy		4,936	5,264	11,605	19,334	28,785	39,232	40,465	56,747	
Washington	3,210	8,208	13,247	18,827	23,364	40,001	61,122	109,199	147,307	
Worcester		2,095	2,577	2,962	4,172	7,497	17,049	24,960	41,105	58,295

THE IMPORTS AND EXPORTS OF THE PRINCIPAL NATIONS.

COUNTRIES.	Imports.	Exports.	COUNTRIES.	Imports.	Exports.
Argentine Republic ..	\$44,867,000	\$47,765,000	Italy	\$252,330,285	\$221,383,855
Australia	236,593,915	156,384,280	Japan	32,508,307	28,364,000
Austria-Hungary	268,500,000	352,700,000	Luxembourg		
Austria proper			Mexico	29,062,407	31,659,151
Belgium	476,700,000	401,940,000	Netherlands	305,416,000	226,750,000
Bolivia	5,000,000	5,647,000	Norway	36,500,000	25,000,000
Brazil	111,211,338	89,110,116	Paraguay	565,595	607,653
Canada	96,960,195	82,628,820	Persia	5,625,000	2,813,000
Chili	29,279,112	29,784,195	Peru	24,179,094	57,500,000
China	105,000,000	101,252,000	Portugal	38,131,520	26,448,600
Columbia	10,787,654	13,711,511	Prussia		
Denmark	57,241,360	45,966,600	Roumania	50,896,626	47,730,301
Ecuador	7,596,264	8,684,331	Russia	365,426,400	260,484,000
Egypt	25,655,000	68,918,000	Siam	6,197,000	5,500,000
France	918,967,400	632,618,000	Spain	7,100,000	8,300,000
Germany (all the States) ..	930,675,000	729,100,000	Sweden	66,670,000	75,564,000
Great Britain & Ireland ..	1,814,999,375	1,243,916,820	Switzerland	85,906,800	62,532,960
Greece	29,101,400	17,992,000	Turkey	72,430,000	51,000,000
Guiana	1,811,770	2,241,040	United States	760,989,056	852,781,577
Hawaii	3,046,000	3,548,000	Uruguay	15,928,000	17,442,000
Hungary proper			Venezuela	14,800,000	11,300,000
India, British	224,288,165	324,595,525			

TELEGRAPHS OF THE U. S.

THE WESTERN UNION TELEGRAPH CO.

YEAR.	Miles of Line.	Miles of Wire.	No. of Offices.	YEAR.	Miles of Line.	Miles of Wire.	No. of Offices.
1866.....	37,380	75,686	2,250	1875.....	72,833	179,496	6,565
1867.....	46,270	85,291	2,565	1876.....	73,532	183,832	7,072
1868.....	50,183	97,594	3,219	1877.....	76,955	194,323	7,500
1869.....	52,099	104,584	3,607	1878.....	81,002	206,202	8,014
1870.....	54,109	112,191	3,972	1879.....	82,987	211,566	8,534
1871.....	56,032	121,151	4,606	1880.....	85,645	223,534	9,077
1872.....	62,033	137,190	5,237	All other Co.'s.	33,743	99,305	2,415
1873.....	65,757	154,472	5,740	Total.....	119,388	332,839	11,492
1874.....	71,585	175,735	6,188				

This does not include railway, government and private lines, the length of which cannot be accurately ascertained.

THE RAILROADS OF THE WORLD.

MILES OF LINE.

COUNTRIES.		Miles.	COUNTRIES.		Miles.
1. NORTH AMERICA.	United States.....	86,497	4. EUROPE, Continued.	Switzerland.....	1,609
	Canada.....	6,484		Italy.....	4,999
	Mexico.....	678		Turkey.....	1,032
Total.....		93,659		Roumania.....	862
MIDDLE AMERICA.	Honduras.....	56		Greece.....	7
	Costa Rica.....	74	Total.....		100,920
	Cuba (Spanish).....	858	5. ASIA.....	Turkey in Asia.....	250
	Jamaica (British)....	24		India (British).....	8,615
	Panama (Colombia)....	48		Ceylon (British)....	108
Total.....		1,060		Java (Dutch).....	499
3. SOUTH AMERICA.	Bolivia.....	31		Philippines (Spanish).....	279
	Colombia.....	64		China.....	67
	Ecuador.....	76	Total.....		9,818
	Venezuela.....	70	6. AFRICA.	Egypt.....	928
	Guiana (British)....	21		Tunis.....	115
	Brazil.....	1,711		Algeria (French)....	708
	Peru.....	1,750		Cape Colony (British).....	662
	Chili.....	1,049		Namaqualand.....	95
	Argentine Republic..	1,439		Natal (British).....	5
	Paraguay.....	44		Mauritius.....	65
	Uruguay.....	233	Total.....		2,578
Total.....		6,488	7. AUSTRALIA.	New South Wales..	736
4. EUROPE.....	Great Britain and Ireland.....	17,606		Queensland.....	503
	France.....	15,287		Victoria.....	1,125
	Spain.....	4,264		South Australia.....	559
	Portugal.....	795		Western Australia..	72
	Belgium.....	2,324		Tasmania.....	172
	Netherlands.....	1,199		New Zealand.....	1,171
	Denmark.....	849	Total.....		4,338
	Sweden.....	3,260	GRAND TOTAL..		
	Norway.....	658			
	Russia.....	13,571			
	Germany.....	21,037			
	Austria-Hungary ..	11,471			218,861

TABLE SHOWING VARIATIONS OF TIME AND DISTANCES FROM
NEW YORK CITY, TO PRINCIPAL PLACES IN THE U. S.

NAMES OF CITIES.	Time when it is 12 noon at N. Y.	Distance by rail from N. Y.	NAMES OF CITIES.	Time when it is 12 noon at N. Y.	Distance by rail from N. Y.
		Miles.			Miles.
Albany, N. Y.....	12.01 P.M.	145	Montgomery, Ala.....	11.10 A.M.	1,056
Atlanta, Ga.....	11.18 A.M.	881	Nashville, Tenn.....	11.09 A.M.	1,053
Auburn, N. Y.....	11.50 A.M.	319	Newark, N. J.....	11.59 A.M.	10
Baltimore, Md.....	11.50 A.M.	188	Newburgh, N. Y.....	12.00 M.	63
Bangor, Me.....	12.21 P.M.	478	Newburyport, Mass.....	12.12 P.M.	270
Boston, Mass.....	12.12 P.M.	223	New Haven, Conn.....	12.04 P.M.	77
Bridgeport, Conn.....	12.03 P.M.	59	New Orleans, La.....	10.56 A.M.	1,377
Brooklyn, N. Y.....	12.00 M.	2	Newport, R. I.....	12.11 P.M.	185
Buffalo, N. Y.....	11.30 A.M.	424	Norfolk, Va.....	11.51 A.M.	372
Burlington, Iowa.....	10.51 A.M.	1,120	Northampton, Mass.....	12.05 P.M.	156
Burlington, Vt.....	12.03 P.M.	302	Norwich, Conn.....	12.07 P.M.	140
Charleston, S. C.....	11.36 A.M.	804	Ogdensburg, N. Y.....	11.54 A.M.	374
Chicago, Ill.....	11.05 A.M.	913	Omaha, Neb.....	10.32 A.M.	1,406
Cincinnati, O.....	11.18 A.M.	758	Philadelphia, Pa.....	11.55 A.M.	89
Cleveland, O.....	11.29 A.M.	585	Pittsburg, Pa.....	11.36 A.M.	445
Columbus, O.....	11.24 A.M.	639	Pittsfield, Mass.....	12.02 P.M.	161
Concord, N. H.....	12.10 P.M.	274	Portland, Me.....	12.15 P.M.	341
Council Bluffs, Iowa.....	10.34 A.M.	1,389	Poughkeepsie, N. Y.....	12.00 M.	76
Davenport, Iowa.....	10.53 A.M.	1,096	Providence, R. I.....	12.10 P.M.	189
Dayton, O.....	11.19 A.M.	709	Richmond, Va.....	11.46 A.M.	343
Denver, Col.....	9.57 A.M.	1,982	Rochester, N. Y.....	11.43 A.M.	374
Des Moines, Iowa.....	10.42 A.M.	1,270	Sacramento, Cal.....	8.50 A.M.	3,183
Detroit, Mich.....	11.24 A.M.	776	St. Louis, Mo.....	10.55 A.M.	1,066
Dubuque, Iowa.....	10.54 A.M.	1,103	St. Paul, Minn.....	10.44 A.M.	1,322
Easton, Pa.....	11.55 A.M.	76	Salt Lake City, Utah.....	9.28 A.M.	2,476
Elmira, N. Y.....	11.49 A.M.	275	San Antonio, Tex.....	10.23 A.M.	1,952
Evansville, Ind.....	11.07 A.M.	995	San Francisco, Cal.....	8.46 A.M.	3,273
Fort Wayne, Ind.....	11.15 A.M.	765	Savannah, Ga.....	11.32 A.M.	919
Galveston, Tex.....	10.57 A.M.	1,789	Springfield, Ill.....	10.58 A.M.	1,032
Harrisburg, Pa.....	11.49 A.M.	183	Springfield, Mass.....	12.05 P.M.	139
Hartford, Conn.....	12.05 P.M.	113	Syracuse, N. Y.....	11.51 A.M.	293
Indianapolis, Ind.....	11.12 P.M.	826	Terre Haute, Ind.....	11.07 A.M.	589
Kansas City, Mo.....	10.37 A.M.	1,343	Toledo, O.....	11.22 A.M.	706
Keokuk, Iowa.....	10.50 A.M.	1,128	Trenton, N. J.....	11.54 A.M.	58
Leavenworth, Kan.....	10.37 A.M.	1,369	Troy, N. Y.....	11.58 A.M.	151
Little Rock, Ark.....	10.47 A.M.	1,411	Utica, N. Y.....	11.50 A.M.	240
Louisville, Ky.....	11.14 A.M.	868	Vicksburg, Miss.....	10.59 A.M.	1,287
Lowell, Mass.....	12.10 P.M.	245	Washington, D. C.....	11.48 A.M.	228
Memphis, Tenn.....	10.55 A.M.	1,245	Wheeling, W. Va.....	11.23 A.M.	511
Milwaukee, Wis.....	11.05 A.M.	998	Wilmington, Del.....	11.54 A.M.	118
Mobile, Ala.....	11.04 A.M.	1,236	Worcester, Mass.....	12.10 P.M.	193

THE NAVIES OF THE WORLD.

COUNTRIES.	No. of Vessels.	No. of Men.	COUNTRIES.	No. of Vessels.	No. of Men.
Argentina Republic...	28	3,135	Italy.....	66	11,880
Austria-Hungary.....	68	6,819	Japan.....	21	3,944
Belgium.....	10	172	Mexico.....	4	.....
Bolivia.....	37	.....	Netherlands.....	105	4,996
Brazil.....	63	6,184	Norway.....	119	4,342
Canada (Dominion).....	7	.....	Peru.....	18	.....
Chili.....	15	840	Portugal.....	37	3,853
China.....	38	.....	Roumania.....	9	266
Denmark.....	23	1,125	Russia.....	223	30,039
Egypt.....	14	.....	Spain.....	138	14,648
France.....	226	50,517	Sweden.....	141	6,141
Germany.....	60	8,051	Turkey.....	170	6,000
Gt. Britain & Ireland..	531	81,447	United States.....	146	8,684
Greece.....	21	652			

RULERS OF THE PRINCIPAL NATIONS OF THE WORLD 1882.

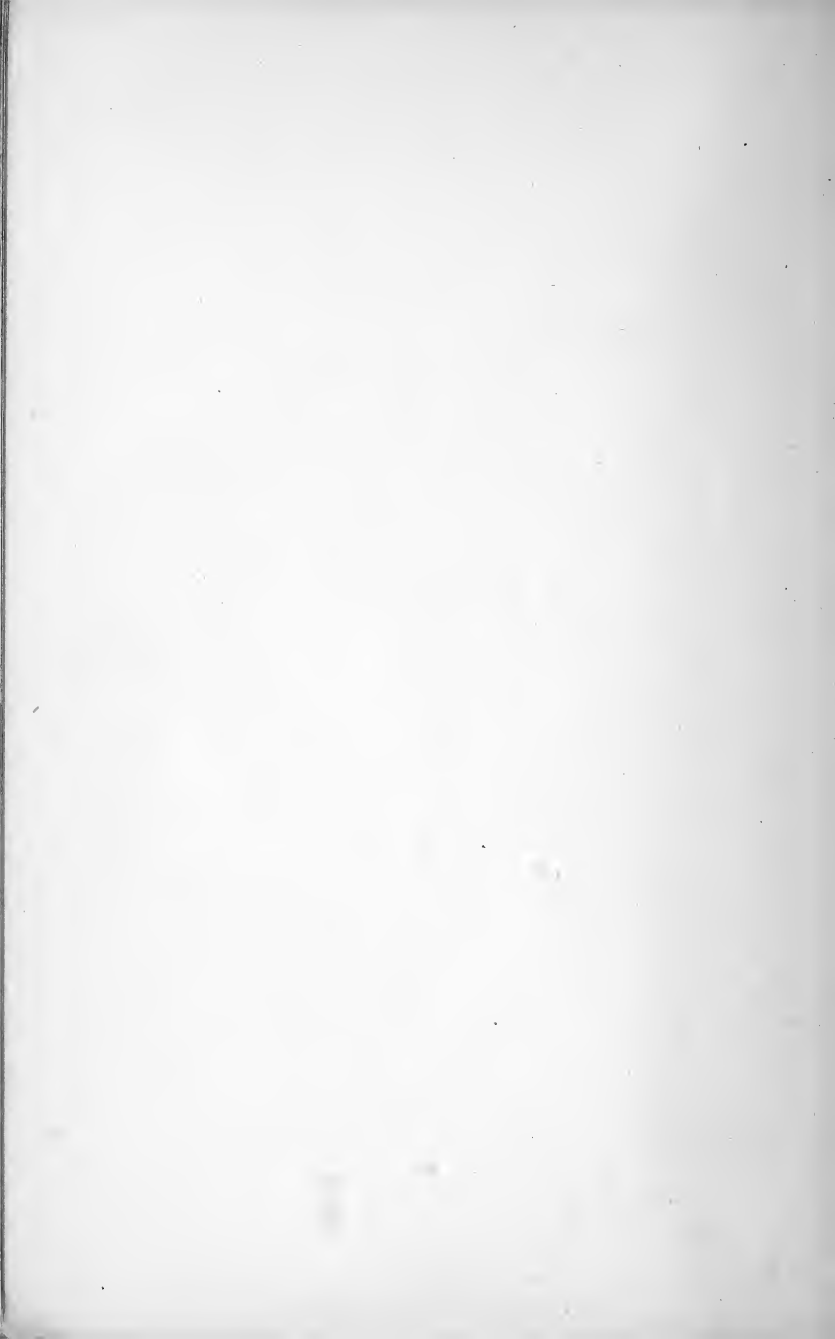
GOVERNMENTS.	RULERS.	TITLE.	Year of Birth.	Date of Accession.
Argentine Republic.....	Julio A. Roca.....	President.....	.....	June — 1880
Austria-Hungary.....	Franz Joseph I.....	Emperor.....	1830	Dec. 2, 1848
Belgium.....	Leopold II.....	King.....	1835	Dec. 10, 1865
Bolivia.....	Nicolas Campero.....	President.....	.....	June 1, 1880
Brazil.....	Pedro II. Alcântara.....	Emperor.....	1825	April 7, 1831
Chili.....	Anibal Pinto.....	President.....	.....	Sept. 18, 1876
China.....	Kwong Shu.....	Emperor.....	1871	Jan. 12, 1875
Colombia.....	R. Nuñez.....	President.....	.....	April 1, 1880
Costa Rica.....	Tomas Guardia.....	President.....	.....	Provisional.
Denmark.....	Christian IX.....	King.....	1818	Nov. 15, 1863
Ecuador.....	José de Vintimilla.....	President.....	.....	Sept. 8, 1876
France.....	François P. Jules Grévy.....	President.....	1813	Jan. 39, 1879
Germany.....	Wilhelm I.....	Emperor.....	1797	Jan. 18, 1871
Alsace-Lorraine.....	F. M. Baron Manteuffel.....	Oberpräsident.....	.....	1880
Anhalt.....	Friedrich.....	Duke.....	1831	May 22, 1871
Baden.....	Friedrich I.....	Grand Duke.....	1826	April 24, 1852
Bavaria.....	Ludwig II.....	King.....	1845	Mar. 10, 1864
Bremen.....	.....	Burgomasters.....	.....	.....
Brunswick.....	Wilhelm I.....	Duke.....	1806	April 20, 1831
Hamburg.....	.....	Burgomasters.....	.....	.....
Hesse.....	Ludwig IV.....	Grand Duke.....	1834	June 13, 1877
Lippe.....	G. F. Waldemar.....	Prince.....	1824	Dec. 8, 1875
Lubeck.....	.....	Burgomasters.....	.....	.....
Mecklenburg-Schwerin.....	Friedrich Franz II.....	Grand Duke.....	1823	Mar. 7, 1842
Mecklenburg-Strelitz.....	Friedrich Wilhelm.....	Grand Duke.....	1819	Sept. 6, 1860
Oldenburg.....	Peter.....	Grand Duke.....	1827	Feb. 27, 1853
Prussia.....	Wilhelm I.....	King.....	1797	Jan. 2, 1861
Reuss-Greiz.....	Henrich XXII.....	Prince.....	1846	Nov. 8, 1859
Reuss-Schleitz.....	Henrich XIV.....	Prince.....	1832	July 10, 1867
Saxe-Altenburg.....	Ernst.....	Duke.....	1826	Aug. 3, 1853
Saxe-Coburg and Gotha.....	Ernst II.....	Duke.....	1818	Jan. 29, 1844
Saxe-Meiningen.....	Georg II.....	Duke.....	1826	Sept. 20, 1866
Saxe-Weimar Eisenach.....	Karl Alexander.....	Grand Duke.....	1818	July 8, 1853
Saxony.....	Albert.....	King.....	1828	Oct. 29, 1873
Schaumburg-Lippe.....	Adolf.....	Prince.....	1817	Nov. 21, 1860
Schwarzburg-Rudolstadt.....	Georg.....	Prince.....	1838	Nov. 26, 1869
Schwarzburg-Sondershausen.....	Günther III.....	Prince.....	1830	July 17, 1880
Waldeck.....	Georg Victor.....	Prince.....	1831	May 14, 1845
Württemberg.....	Karl I.....	King.....	1823	June 25, 1864
Great Britain and Ireland.....	Victoria I.....	Queen & E. of I.....	1819	June 20, 1837
Greece.....	Georgios I.....	King.....	1845	June 6, 1863
Guatemala.....	J. Rufino Barrios.....	President.....	.....	May 7, 1873
Haiti.....	Gen. Salomon.....	President.....	.....	Nov. 25, 1879
Hawaiian Islands.....	Kalākaua I.....	King.....	1836	Feb. 12, 1874
Honduras.....	M. A. Soto.....	President.....	.....	May 29, 1877
Italy.....	Humbert I.....	King.....	1844	Jan. 9, 1878
Japan.....	Mutsu Hito.....	Mikado.....	1852	Feb. 13, 1867
Mexico.....	Manuel Gonzalez.....	President.....	.....	Dec. 1, 1880
Morocco.....	Muley-Hassan.....	Sultan.....	1831	Sept. 25, 1873
Netherlands.....	Willem III.....	King.....	1817	Mar. 17, 1849
Nicaragua.....	Joaquin Zavala.....	President.....	.....	Mar. 1, 1879
Paraguay.....	Candido Bareiro.....	President.....	.....	April 12, 1878
Persia.....	Nassr-ed-deen.....	Shah.....	1829	Sept. 10, 1848
Peru.....	Nicolo Pierola.....	President.....	.....	Dec. 23, 1879
Portugal.....	Luis I.....	King.....	1838	Nov. 11, 1861
Roumania.....	Karl I. Domnu.....	Prince.....	1839	May 10, 1866
Russia.....	Alexander II.....	Emperor.....	1818	Mar. 2, 1855
Salvadore.....	Rafael Zaldivar.....	President.....	.....	April 30, 1876
Santo Domingo.....	F. A. de Moreño.....	President.....	.....	July 23, 1880
Servia.....	Milan IV. Obrenovic.....	Prince.....	1855	July 2, 1868
Spain.....	Alfonso XII.....	King.....	1857	Dec. 30, 1874
Sweden and Norway.....	Oscar II.....	King.....	1829	Sept. 15, 1872
Switzerland.....	Numa Droz.....	President.....	.....	Jan. 1, 1881
Turkey.....	Abdul-Hamid-Khan.....	Sultan.....	1842	Aug. 31, 1876
Egypt.....	Tewfik Pacha.....	Khedive.....	.....	June 25, 1879
United States.....	Chester A. Arthur.....	President.....	1830	Sept. 20, 1881
Uruguay.....	F. A. Vidal.....	President.....	.....	Mar. 17, 1880
Venezuela.....	Guzman Blanco.....	President.....	.....	Feb. 26, 1879

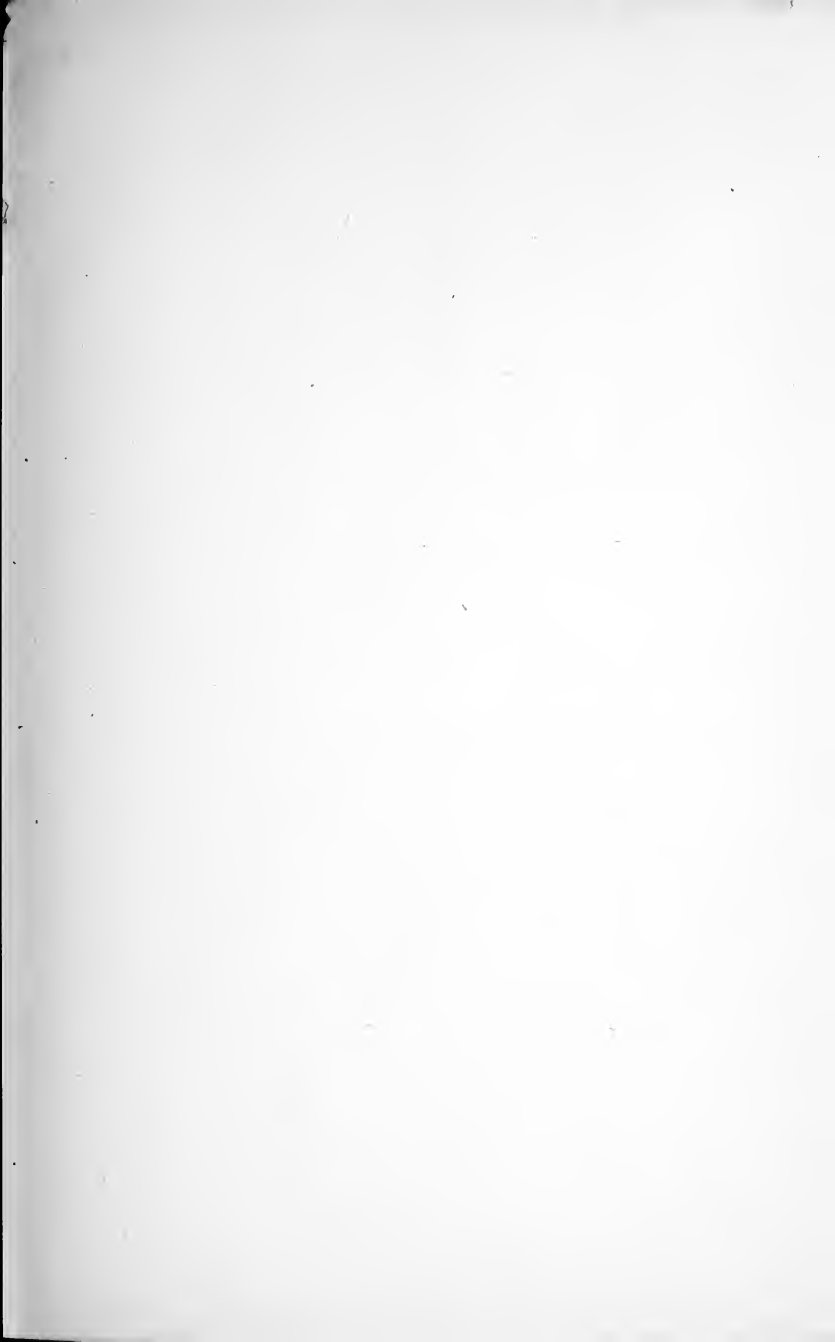
THE ARMIES OF THE WORLD.

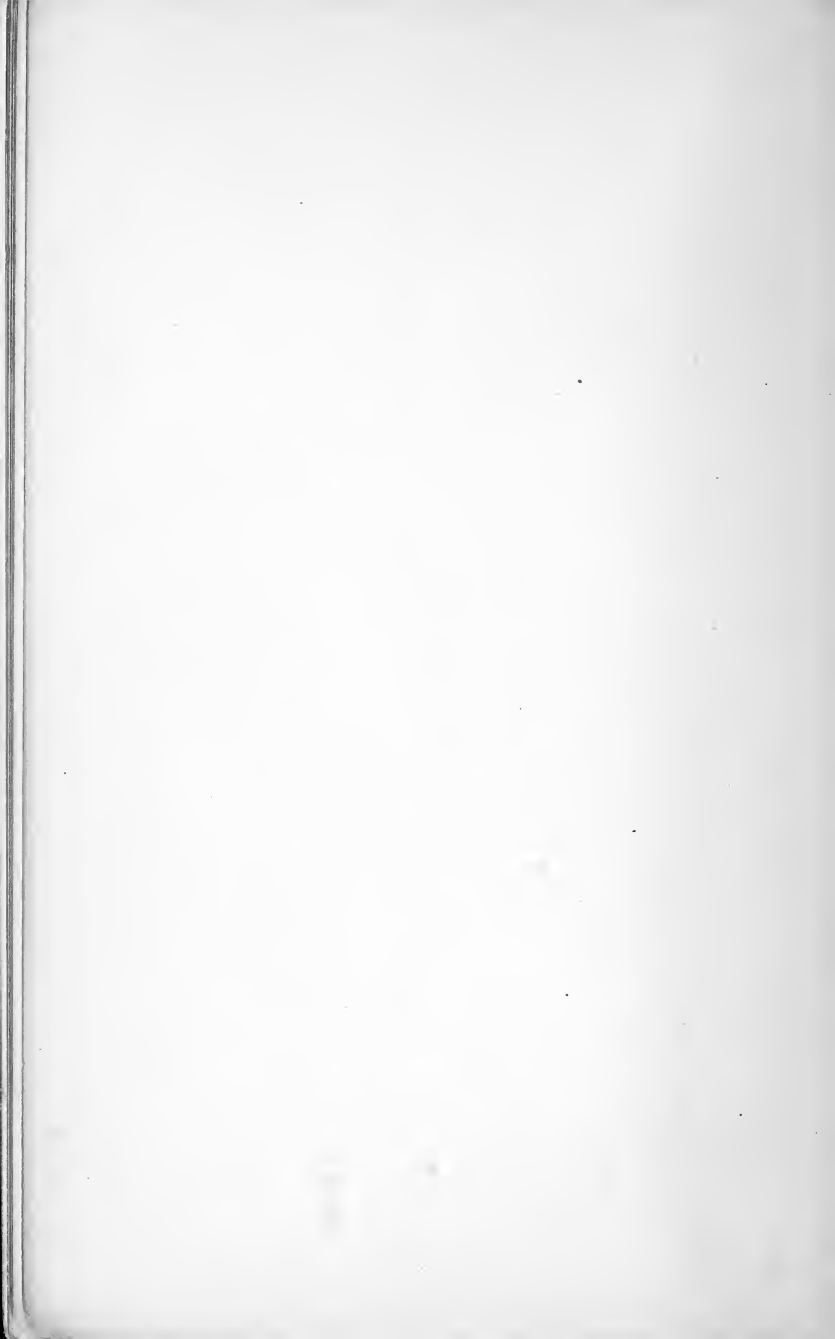
COUNTRIES.	Strength of Army.		COUNTRIES.	Strength of Army.	
	Peace Footing.	War Footing.		Peace Footing.	War Footing.
Austria-Hungary.....	296,218	1,021,692	Luxembourg.....	513	.....
Argentine Republic.....	8,283	.....	Mexico.....	22,387	.....
Belgium.....	46,277	103,683	Netherlands.....	61,803	160,000
Bolivia.....	4,022	.....	Norway.....	12,750	18,000
Brazil.....	16,500	32,000	Persia.....	28,400	108,500
Canada.....	3,000	655,000	Peru.....	15,200	.....
Chili.....	3,516	28,274	Portugal.....	35,733	75,000
China.....	700,000	1,260,000	Roumania.....	130,158	144,668
Colombia.....	2,600	30,000	Russia.....	787,900	1,671,674
Denmark.....	35,703	50,000	Servia.....	14,150	150,000
Egypt.....	62,920	128,000	Spain.....	330,000	400,000
France.....	470,600	1,750,000	Sweden.....	36,495	156,970
Germany.....	419,659	1,024,524	Switzerland.....	106,102	203,262
Great Britain.....	133,720	370,561	Turkey.....	157,667	618,100
Greece.....	12,397	30,000	United States.....	26,914	3,759,693
India, British.....	58,170	144,700	Uruguay.....	4,060	24,000
Italy.....	199,577	867,509	Venezuela.....	5,494	.....
Japan.....	35,380	50,240			

VALUE OF STANDARD MONEY OF THE PRINCIPAL FOREIGN NATIONS IN U. S. MONEY.

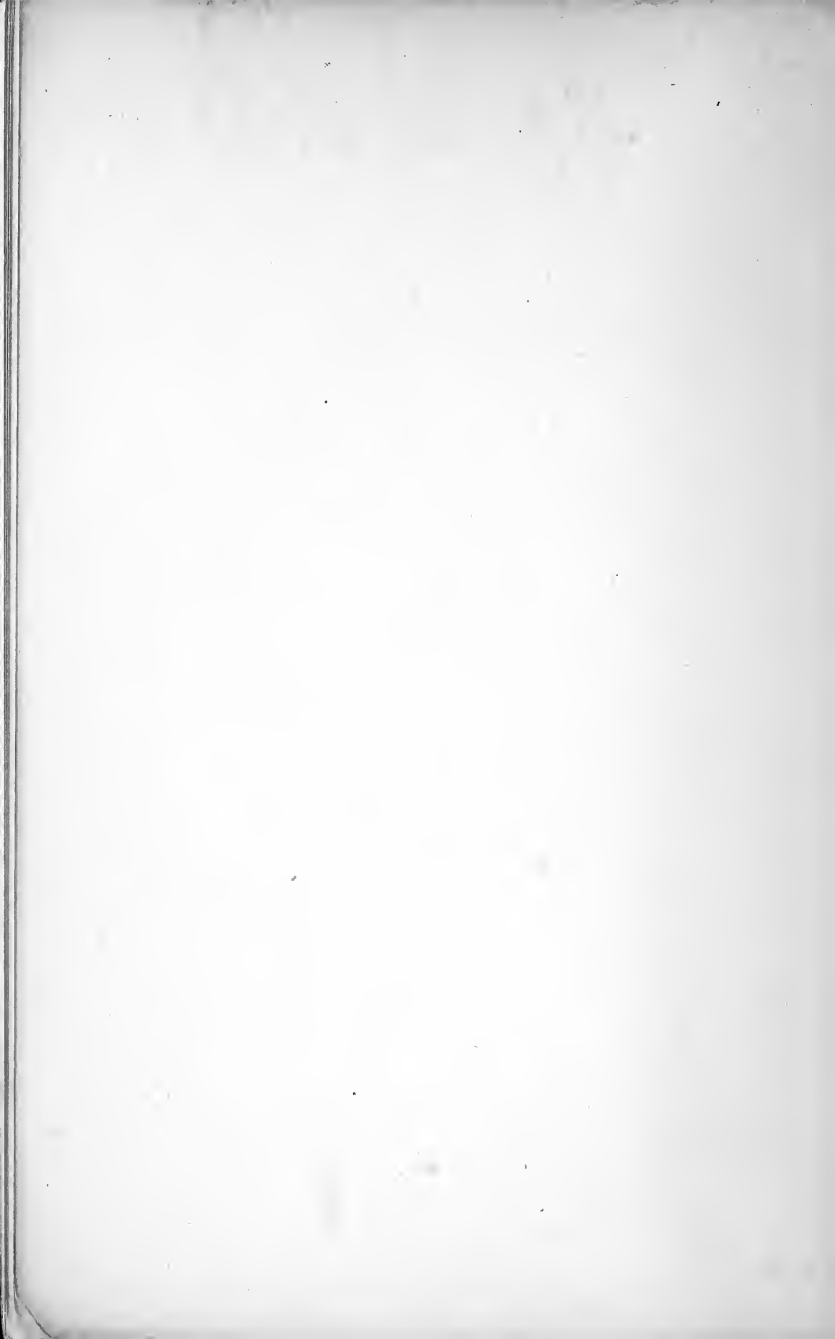
AUSTRIA.	GERMANY.	SPAIN.
Florin..... 41c.	Mark..... 23c.	Peseta..... 19c.
BELGIUM.	GREAT BRITAIN.	SWEDEN.
Franc..... 19c.	Pound Sterling..... \$4 86c.	Crown..... 26c.
DENMARK.	ITALY.	SWITZERLAND.
Crown..... 26c.	Lira..... 19c.	Franc..... 19c.
FRANCE.	RUSSIA.	
Franc..... 19c.	Roubles..... 74c.	













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THE INVENTOR'S MANUAL

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